A-dec 200™ Service Guide

A-dec 200 Service Guide

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Intended Application and Use

This equipment/system is intended for diagnostic and therapeutic treatment of dental patients by licensed health care professionals.

A dental operative unit (with or without accessories) is an AC-powered device intended to supply power to and serve as a base for other dental devices, such as a dental handpiece, a dental operating light, an air or water syringe unit, an oral cavity evacuator, a suction operative unit, and other dental devices and accessories.

Comments and Feedback

If you have any feedback or comments about this document, contact:

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Regulatory Information

Regulatory information is provided with A-dec equipment as mandated by agency requirements. This information is delivered in the equipment's *Instructions for Use* or the separate *Regulatory Information and Specifications* document. If you need this information, please go to the Document Library at www.a-dec.com.

Product Service

For service information, contact your local authorized A-dec dealer. To find your local dealer, go to www.a-dec.com.

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INTRODUCTION

The A-dec 200 Service Guide provides service information for the A-dec 200 dental system, including the chair, programming, delivery system, cuspidor and support center, assistant's instrumentation, utilities, and dental light. Users of this guide should understand basic operation and maintenance of dental and medical equipment, and use of flow diagrams.

CAUTION Possible injury or equipment damage. Service to be performed by trained personnel only.

Get Support

For questions not addressed in this document, contact A-dec Customer Service using contact information for your region.

International Customer Service

2601 Crestview Drive
Newberg, Oregon 97132
Telephone: 1 (503) 538-9471 or 1 (503) 538-7478
Fax: (503) 538-5911
Internet: www.a-dec.com

Inside this Guide

This guide contains service, maintenance and adjustments; flow diagrams; exploded parts breakdown of assemblies; and troubleshooting.

The following regulatory symbols may appear throughout the document.

NOTE Notes indicate additional information, and when it is important that instructions are followed.

TIP Tips indicate tips or tricks to make installation, use, or maintenance easier.

WARNING Warning indicates potential severe injury or death if instructions are not followed properly.

CAUTION Caution indicates when failure to follow instructions could result in damage to product or minor injury.

DANGER Danger indicates warnings of dangerous voltage and of certain electrical shock.

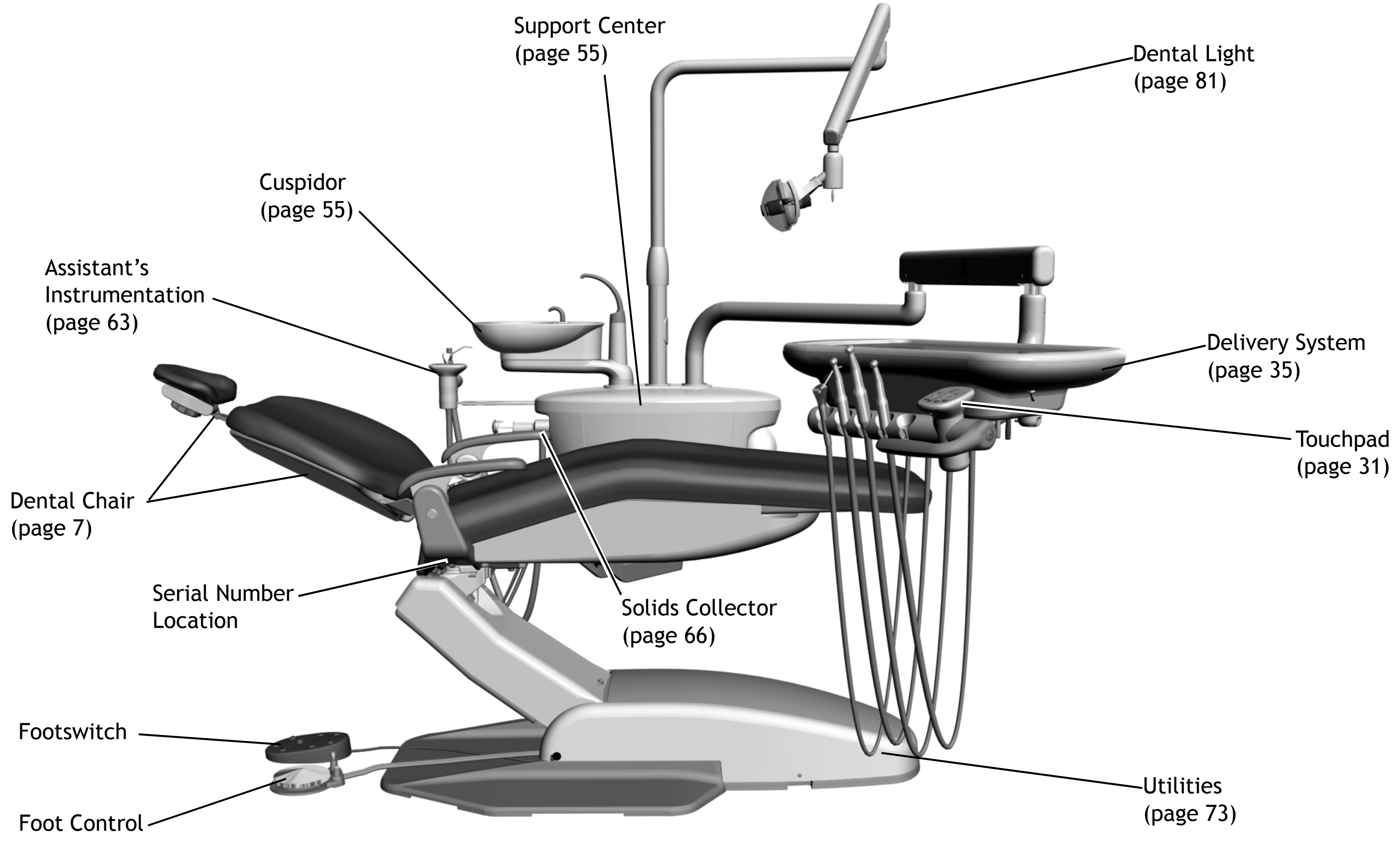
BIOHAZARD Biohazard indicates potential infection if instructions are not properly followed.

IMPORTANT Important indicates areas in which to refer to or use specific instructions.

A-dec 200 System

A-dec 200 system comes configured as shown below:

Figure 1. A-dec 200 Systems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Serial and Model Numbers

Product serial and model number information can be found on the serial/model number labels. When you contact customer service, the serial number helps identify the product and when it was manufactured.

Use Table 1 and Figure 2 to reference how to identify serial/model number information.

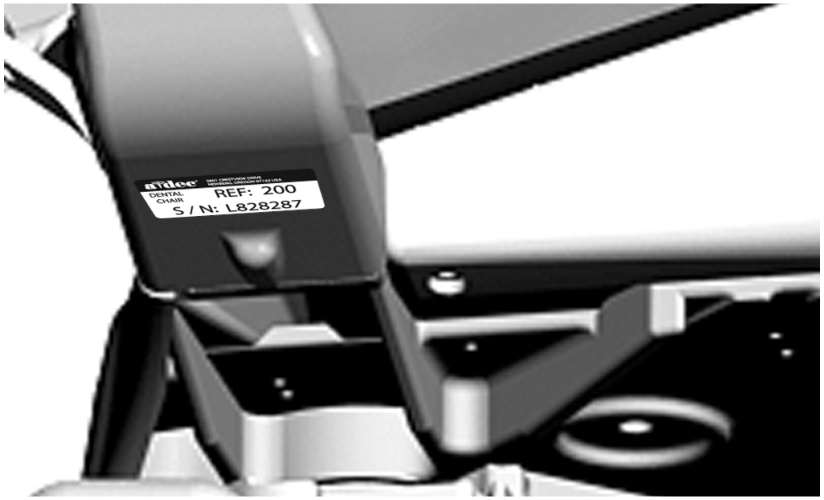
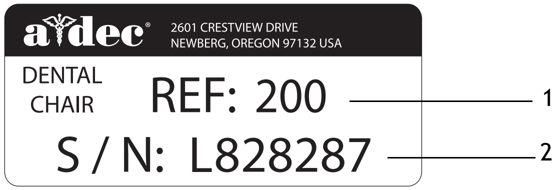

a-dec
DENTAL CHAIR
REF: 200
S / N: L828287

Table 1. Month Identification Table

Letter	Month	Letter	Month
A	January	G	July
B	February	H	August
C	March	I	September
D	April	J	October
E	May	K	November
F	June	L	December

Figure 2. Serial Number Label Example


a-dec
2601 CRESTVIEW DRIVE
NEWBERG, OREGON 97132 USA
DENTAL CHAIR
REF: 200
S / N: L828287
1
2

(1) The REF number is the model number. (2) The first letter of the serial number indicates the month the product was manufactured. The first digit of the serial number is the year of manufacture (for example, L8 = December 2008).

Service Tools

This table lists the types of tools available from A-dec for servicing A-dec 200 equipment and their recommended use:

Table 2. Recommended Tools

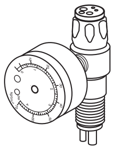
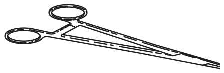
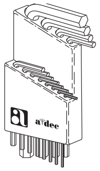
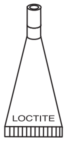
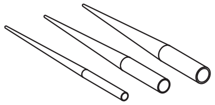
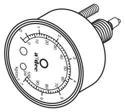
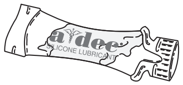
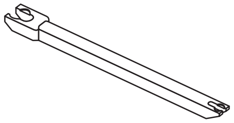
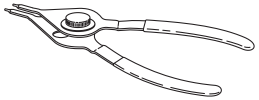
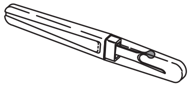
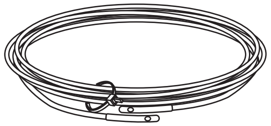
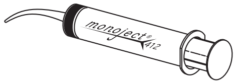
Tool	Task	Part Illustration	Part Number
Drive air pressure gauge	Adjusting handpiece drive air pressure, 0-60 psi (4.13 bar) This gauge does not fit the Borden 3-hole coupler		50.0271.00
Hemostat	• Troubleshooting or repairing a unit • Stopping air or water flow through tubing		009.008.00
Hex key set	Servicing or installing A-dec equipment (plastic case included)		009.018.00
Loctite®	Installing threaded fasteners to prevent loosening		060.001.00 (Red 271) 060.002.00 (Blue 242)
O-ring tools	Replacing O-rings during quick field repairs (fits the four smallest O-ring sizes)		009.013.00
Panel mount gauge	• Checking air/water pressure • Checking inline pressure gauge for testing purposes		026.118.00

Table 2. Recommended Tools (continued)

Tool	Task	Part Illustration	Part Number
A-dec Silicone lubricant	Lubricating internal moving parts such as O-rings, oral evacuator valves, and bushings **CAUTION** Use only A-dec Silicone lubricant or the O-rings may be damaged.		98.0090.01
Sleeve tool	Aiding in securing 1/4" tubing sleeves and 1/8" uni-clamps		98.0072.00
Snap ring tool	Installing and removing internal and external snap rings (fits all snap rings used in A-dec equipment)		009.007.00
Tubing stripper	Separating the extruded air and water lines in vinyl tubing		009.035.00
Umbilical stringer	Routing additional tubing or wiring through existing umbilical assemblies (12’ [3.66 meter] stringer with threading holes on both ends)		009.015.00
Valve test syringe	Testing of pilot operated valves; used to apply a static pressure of 5-75 psi (.34-5.17 bar)		98.0050.01

DENTAL CHAIR

This section provides detailed information related to service, maintenance, and adjustment of the A-dec 200 dental chair.

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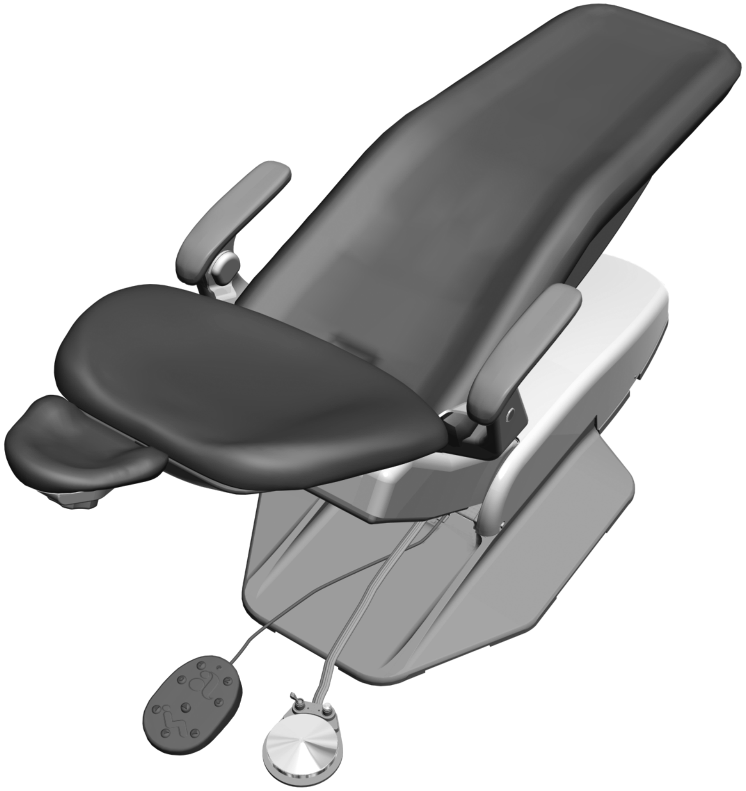
- Product Overview, page 8
- Service, Maintenance, and Adjustments, page 10
- Illustrated Parts Breakdown, page 17

Figure 3. A-dec 200 Chair



Product Overview

Chair Load Capacity

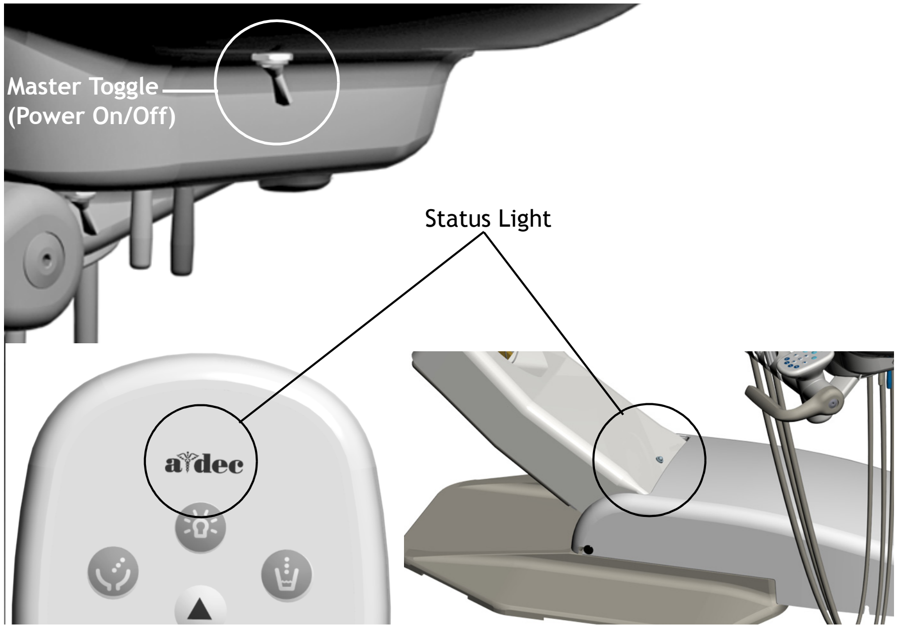
Maximum Chair Capacity:

- Patient Load 136 kg (300 lbs.)
- Module/Accessory Loads (*maximum off-center*) with A-dec 200 system: 68 kg (150 lbs.) @ 406 mm (16")

Power and Status

The chair and system is controlled by the master toggle on the delivery system. The power should always be turned off for service. When the A-dec logo on the touchpad or the status light on the chair lift arm are illuminated, the system is on and ready for use. If the status light blinks, the limit switch has been activated.

Figure 4. Power and Status

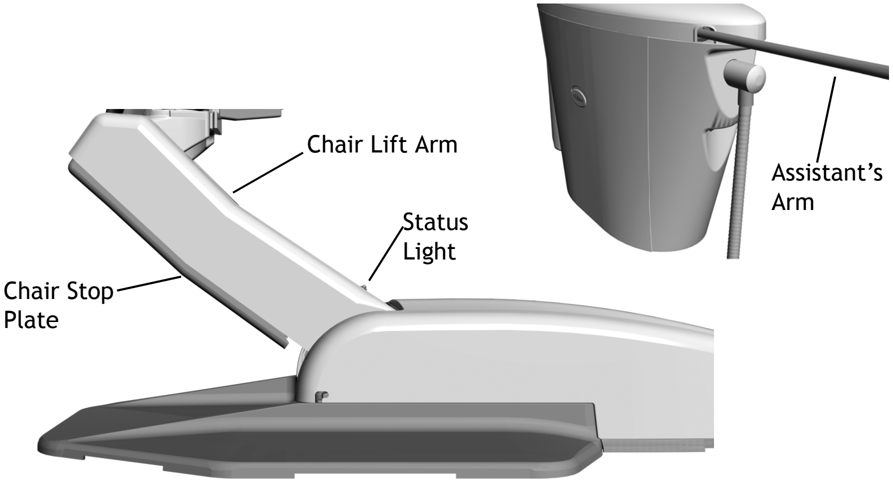


Limit Switch and Chair Lockout

If anything becomes lodged under the chair lift arm or assistant’s arm, a limit switch stops the downward motion of the chair. Pressing the chair stop plate or lifting up on the assistant’s arm activates the limit switches. Use the footswitch or touchpad to raise the chair, then remove the object.

The optional lockout kit inhibits the operation of the dental chair when a handpiece is removed from its holder and the foot control pressed. When this happens, the chair status light blinks quickly. To resume, replace the handpiece and use the footswitch or touchpad to raise the chair.

Figure 5. Chair Lockout Overview

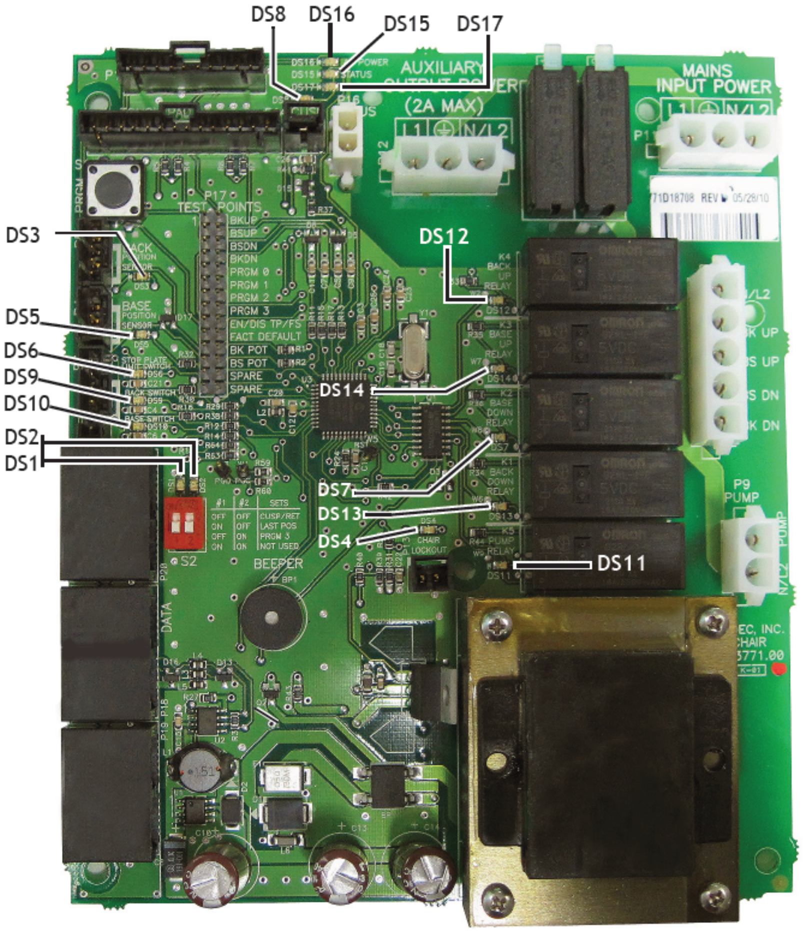


Circuit Board Components

Table 3. LED Identification

LED	Status	Description
DS16 - AC power LED	Off	No 24 VAC power, tripped circuit breaker, power supply turned off, no line voltage
	Green, steady	24VAC at the terminal strip
DS15 - Status LED	Off	System is not functioning, no power or circuit board has failed
	Green, steady	Normal operation
DS17 - Data LED	Off	No DCS communication, not connected to the DCS, or DCS has failed
	Green, steady	Detects active DCS
	Green, blinking	Valid DCS Message
DS6 Stop plate limit switch	Off	Closed, (normal)
	Red	Open, (activated)
DS4 - Chair lockout	Off	Open, (normal)
	Red	Closed, (activated)
DS3 and DS5 - Chair potentiometers	Off	Potentiometer: Not connected or bad connection Moving in wrong direction Limited range of motion, or Cable is not on wheel
	Yellow, steady	Normal operation
	Yellow, fast blink	Upper end of travel
DS7, DS13, DS12, DS14 - Chair relay LEDs	Off	Relay is off
	On	Relay is on
DS8		Capacitor switch
DS9		Back up limit switch
DS10		Base up limit switch
DS11		off = relay is off; on = relay is on
DS1, DS2		Position 3 function selection

Figure 6. Chair Circuit Board Components



Service, Maintenance, and Adjustments

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- Potentiometers, page 11
- Hydraulic System, page 13
- Solenoids, page 14
- Test the Motor Pump, page 15
- Headrest Adjustments, page 16
- Chair Speed Adjustments, page 16

Factory Default Routine

When a new circuit board is installed in the chair, factory default routine needs to be run to learn the range of motion of the chair. The routine:

- Sets the base and back upper limits
- Calculates new presets based on actual range of motion of the chair
- Verifies that the potentiometers work

To start the factory default routine, place the “spare” jumper in the factory default position on the P17 test points of the chair circuit board (see "Circuit Board Components" on page 9 for reference).

When running the factory default routine the chair:

1. Moves base down
2. Moves base up
3. Moves back down
4. Moves back up
5. Moves base and back to Position 0
6. Beeps three times

NOTE The jumper must remain in the factory default position to complete the factory default routine. The status LEDs on the standard and deluxe touchpads and the chair circuit board double blink while the factory default routine is running and after the routine is complete.

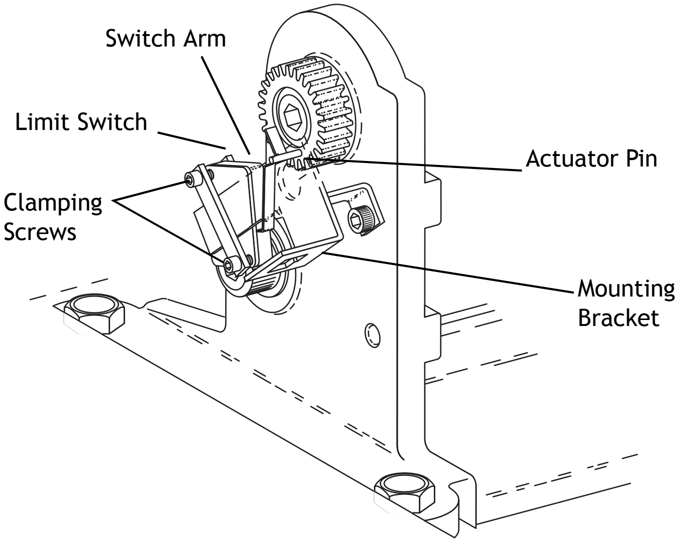
Potentiometers

Potentiometers provide the controller with current position values for the chair base and back. The controller saves the chair values when programmed and compares the values with current position values for the pre-position and auto-return functions.

Adjust the Base Up Limit Switch:

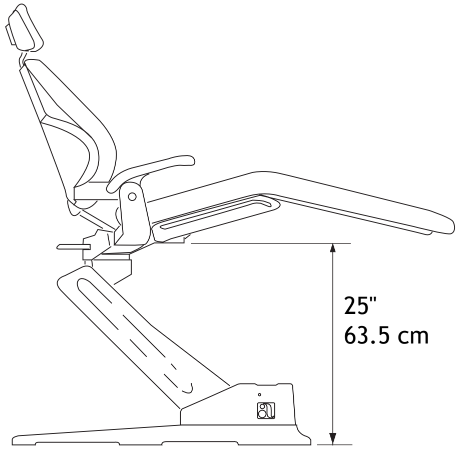
1. Remove the motor pump cover.
2. Loosen the two screws clamping the limit switch to the mounting bracket.

Figure 7. Mounting Bracket



3. Position the chair as shown in Figure 8.

Figure 8. Chair Position



4. Push the limit switch against the actuator on the drive gear until the switch opens (clicks), then tighten the clamping screws. (See Figure 7).
5. Position the chair base down until the limit switch has closed, then position the chair full base up. Check the distance between the top of the base plate to the flat area around the threaded stud the chair adapter mounts to. If the distance is incorrect, repeat steps 2 through 4.

Adjust the Base Positioning Potentiometer

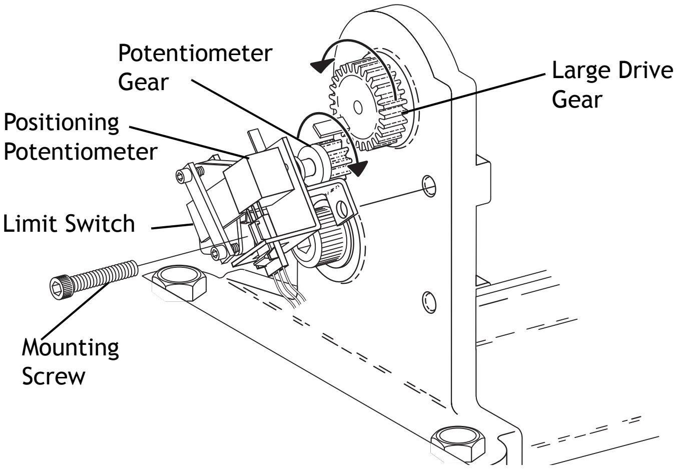
1. Remove the motor pump cover and position the chair base down.
2. Use a 3/16" hex key to remove the limit switch and mounting screw. See Figure 9.
3. Turn the potentiometer gear counterclockwise until it stops.
4. Align the potentiometer assembly, then turn the potentiometer gear clockwise two teeth.
5. Reinstall the limit switch and potentiometer assembly. Make sure the potentiometer gear does not turn and the two gears mesh properly.
6. Ensure that the electrical connections to the limit switch and positioning potentiometer are property set.
7. While observing the two gears for binding, lower the chair base.

⚠ **CAUTION** Do not raise to the full base up position until after you have checked the base up limit switch for proper adjustment. the chair may go into hydraulic lock if not adjusted properly.

---

8. Reinstall the cover, and program the auto-positioning functions.

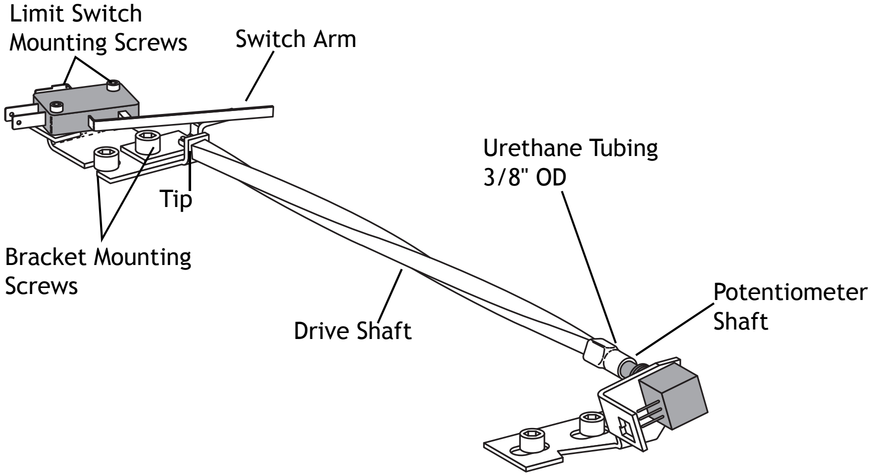
Figure 9. Base Potentiometer


Potentiometer Gear
Large Drive Gear
Positioning Potentiometer
Limit Switch
Mounting Screw

Adjust the Back Potentiometer

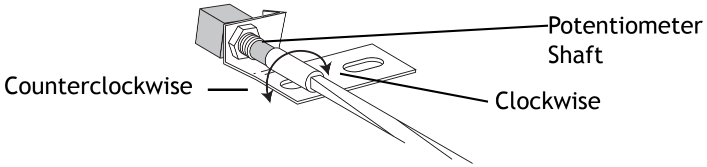
1. Position the chair back to its full up position.
2. Disconnect the limit switch wiring harness from the limit switch.
3. Remove the limit switch mounting screws and limit switch from the bracket. Do not bend the switch arm.
4. Remove the bracket mounting screws.
5. Remove the drive shaft from the potentiometer shaft.
6. Remove the drive shaft from the chair by moving it toward the chair backrest, and slightly to the side to dislodge it from the holder.

Figure 10. Remove Drive Shaft


Limit Switch Mounting Screws
Switch Arm
Urethane Tubing 3/8" OD
Tip
Bracket Mounting Screws
Potentiometer Shaft
Drive Shaft

7. Turn the potentiometer shaft clockwise until it no longer turns, then turn the shaft counterclockwise 1/8" of a turn

Figure 11. Adjust Back Potentiometer


Potentiometer Shaft
Counterclockwise
Clockwise

8. Reinstall the shaft.

Hydraulic System

The hydraulic system consists of:

- Hydraulic fluid reservoir

  The fluid level in the reservoir can be seen through the sides of the reservoir and is serviced via a top fill cap.

- Hydraulic cylinders

  The hydraulic cylinders control the base lift and back functions. Springs and gravity retract the rod during base and back down functions.

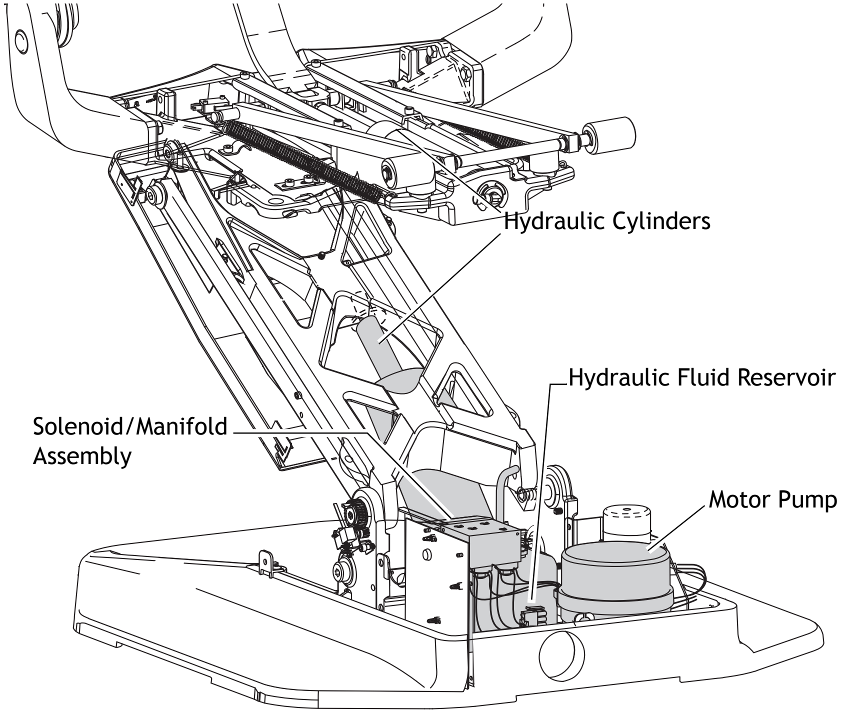
- Motor-driven hydraulic pump

  The hydraulic pump and the starter capacitor supply hydraulic fluid from the reservoir, under pressure, to the chair lift and tilt hydraulic cylinders for back up and base up functions.

- Solenoid/manifold assembly

  This assembly gates hydraulic fluid to and from the two cylinders. Depending on the chair function called for, the controller selects which solenoid-actuated manifold valves are opened or closed. The solenoid/manifold assembly also includes four adjustable needle valves used to restrict or divert the flow of hydraulic fluid to and from the lift and tilt cylinders. These valves provide the rate of travel adjustment for chair base and back movement.

Figure 12. Hydraulic System



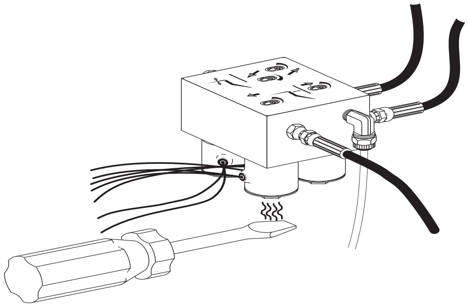
NOTE If cable ties are present in the product and you need to remove them for servicing, make sure to replace the ties after service is completed.

Solenoids

Test the Solenoid

To test the magnetic pull of the solenoid hold the tip of screwdriver near a solenoid and activate the appropriate chair function. You should feel the tug of the magnetic field generated around the solenoid.

Figure 13. Test the Solenoid



Remove and Replace the Solenoid

1. Lower the chair base and back to the full down position. Remove the motor pump cover, then unplug the chair.

WARNING The solenoid coils are powered by line voltage (100, 120, or 240 V). Failure to unplug the chair may result in serious injury from electrical shock.

2. Using a pair of wire cutters, cut the wiring to the faulty solenoid at about mid point between the solenoid and connector P10.
3. Using a 9/16" wrench, remove the solenoid retaining nut and slide the coil off the poppet sleeve.

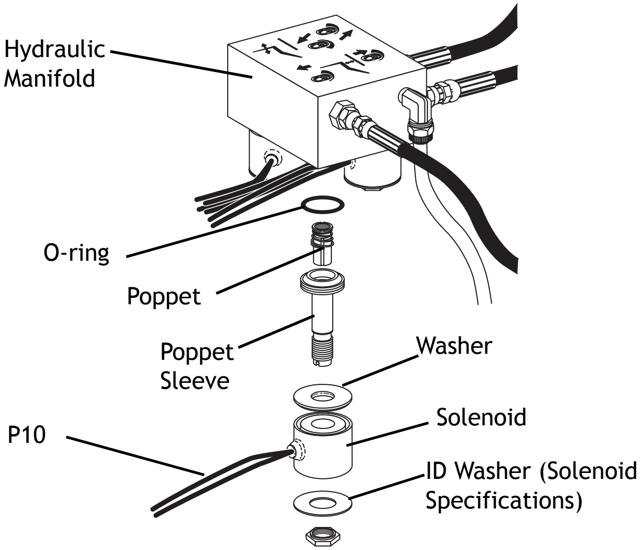
CAUTION Use caution when removing and replacing the coil. The poppet sleeve is easily bent. Even slight bending of the sleeve will result in the malfunction of the solenoid valve.

4. Using a flat-tipped screwdriver, loosen and then remove the sleeve and poppet from the manifold assembly.

WARNING To prevent the possibility of over-heating and failure, replace the entire solenoid assembly.

5. Remove the o-ring from inside the manifold, and install a new o-ring.
6. Install a new sleeve and poppet; tighten the poppet sleeve using a flat-tipped screwdriver.
7. Install a new coil on the plunger. Do not overtighten the retaining nut.
8. Strip approximately 1/4" of insulation from the wires cut in step 2, and install a crimp-on butt-type connector on each wire.
9. On the new solenoid, cut the wiring to length allowing enough to reach the crimped-on connectors. Strip approximately 1/4" of insulation from the wires and crimp each wire into a connector.

Figure 14. Remove and Replace Solenoid



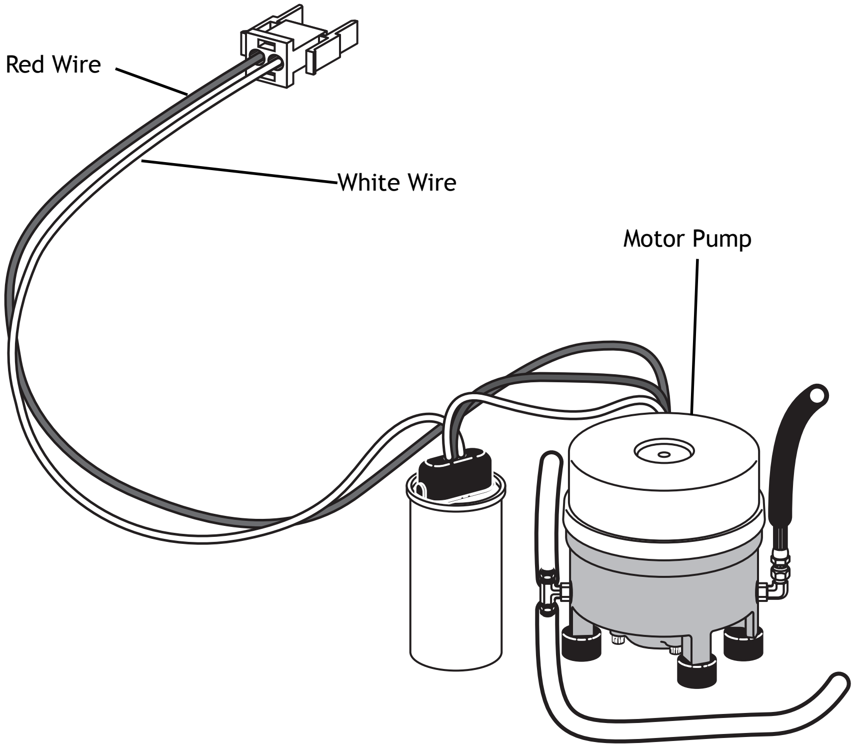
Test the Motor Pump

This test requires the use of a current pickup probe.

- Clip the probe onto the red wire going to the motor pump.
- Use the footswitch or touchpad to raise the chair.

You should read 5 Amps (maximum) of current for 120 V motor pump, or 2.5 Amps (maximum) of current for 240 V motor pump.

Figure 15. Test Motor Pump

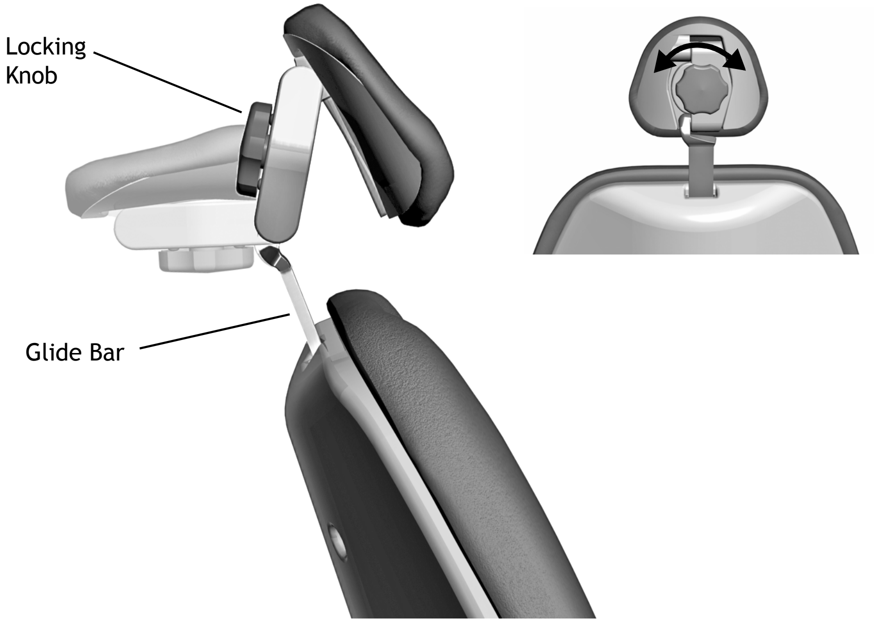


Headrest Adjustments

Turn the locking knob clockwise to lock it into the desired position. Slide the headrest and glide bar up or down to adjust the height.

WARNING When the glidebar has reached its maximum recommended working height, a warning will be visible on the patient's side of the glide bar. Do not use the headrest in a position where this warning is visible.

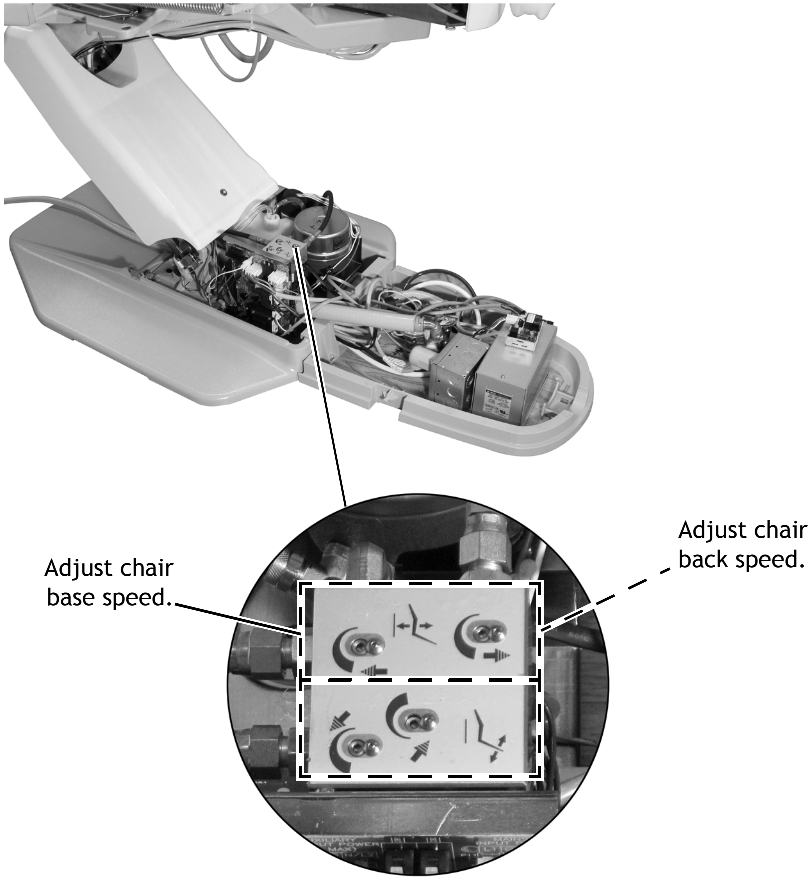
Figure 16. Headrest Adjustments



Chair Speed Adjustments

The speed for moving the chair seat and back can be adjusted. Use a 3/32" hex key to adjust the chair base speed and back speed on the manifold (see

Figure 17. Adjust Manifold for Chair Speed



NOTE If cable ties are present in the product and you need to remove them for servicing, make sure to replace the ties after service is completed.

Illustrated Parts Breakdown

Part Identification

In this section, you will find serviceable components tables that correspond to the illustrations. The tables identify all parts and kits, including those that are not for sale. Parts that are not for sale are indicated with the symbol shown below:

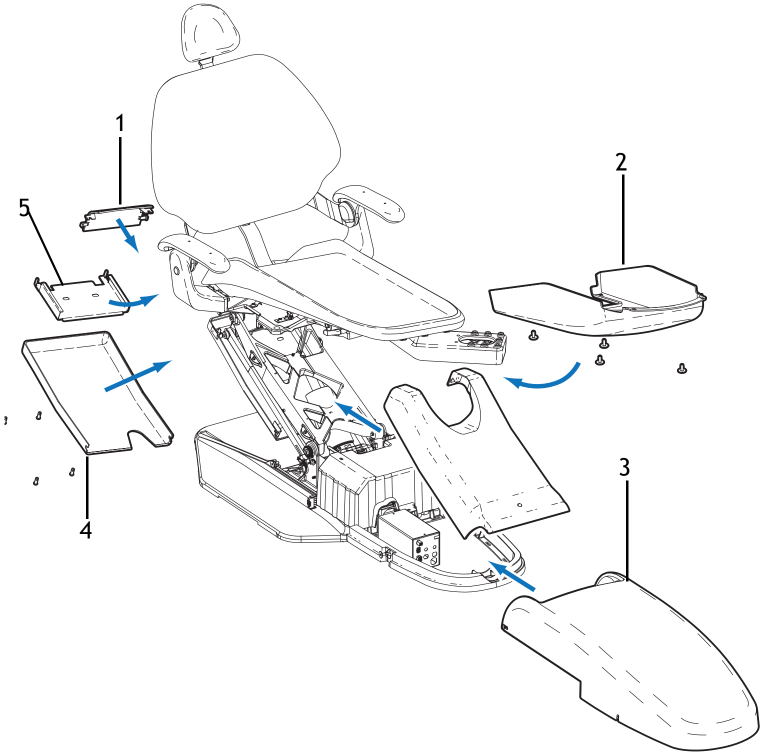
†— Indicates that the individual part is not available for sale. These parts are typically part of a kit and/or larger assembly that is for sale.

Contents

- Chair Covers, page 17
- Upper Chair Assembly, page 18
- Mid Chair Assembly, page 20
- Lower Chair Assembly, page 22
- Headrest Assembly, page 23
- Motor Pump and Capacitor Assembly, page 24
- Hydraulic Manifold Assembly, page 26
- Hydraulic Tank Assembly, page 27
- Base Limit Switch Assembly, page 27
- Back Potentiometer Assembly, page 28
- Base Position Potentiometer Assembly, page 29

Chair Covers

Figure 18. A-dec 200 Dental Chair



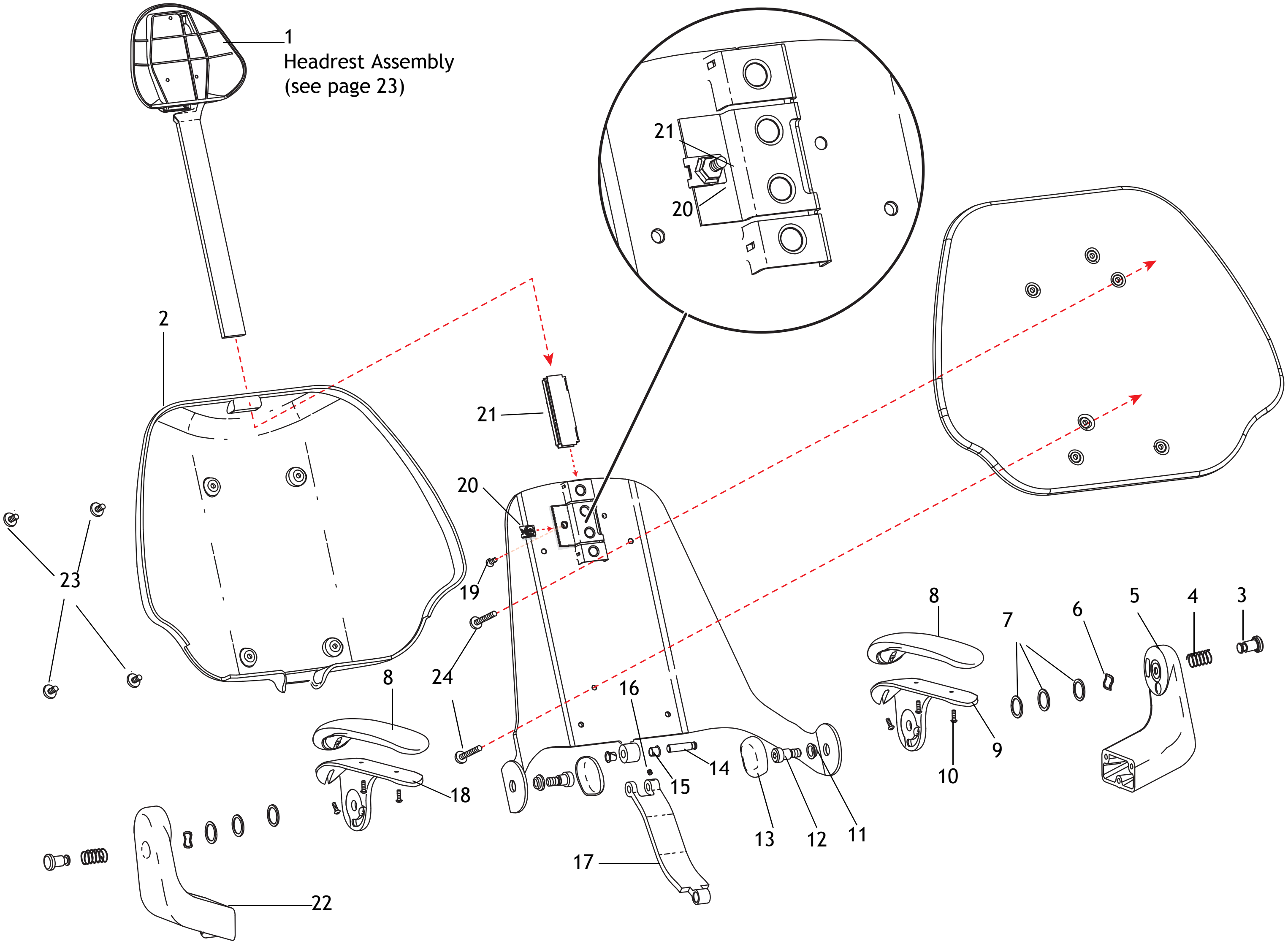
Item	Part Number	Description
1	61.3821.00	Rear chair cover
2	61.3847.00	Bottom cover
3	61.3846.00	Utility cover
4	61.2239.01	Lift arm cover
5	61.2242.00	Umbilical routing bracket

Upper Chair Assembly

Item	Part Number	Description
1	—	Double articulating headrest assembly (see page 23)
2	61.3824.00	Backrest cover
3	61.3791.00	Armrest release button
4	013.052.00	Compression spring, .843 OD X 1.375 FL
5	61.1245.02 †	Arm support, LH
6	004.157.00	Wave spring washer, .990 OD stainless steel
7	004.126.00	Flat washer
8	61.3827.00	Armrest cover
9	61.3790.01	Armrest pivot plate, LH
10	005.123.01	Button head socket screw, 10-32 X 5/8"
11	61.3108.00	Flanged bearing
12	001.164.00	Socket shoulder screw, 1/2-13 X 5/8 X 5/8
13	61.3788.01	Pivot bolt cover
14	61.2740.00	Backrest link pin
15	016.131.00	Flanged bearing
16	007.069.00	Set screw, socket 1/4-20 X 1/4
17	61.3792.00	Back link
18	61.3789.01	Armrest pivot plate, RH
19	005.147.00	Flat head socket screw, 1/4-20 X 1-1/4
20	006.122.01	Retainer nut, 10-32 zinc
21	61.2743.00	Brake shoe
22	61.1247.02 †	Arm support, RH
23	001.268.00	Socket screw, 1/4-20 X 3/30 mm stainless steel
24	002.136.00	Flat head socket screw, 1/4-20 X 1/38

† Indicates that the individual part is not available for sale

Figure 19. Upper Chair Assembly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Headrest Assembly
(see page 23)
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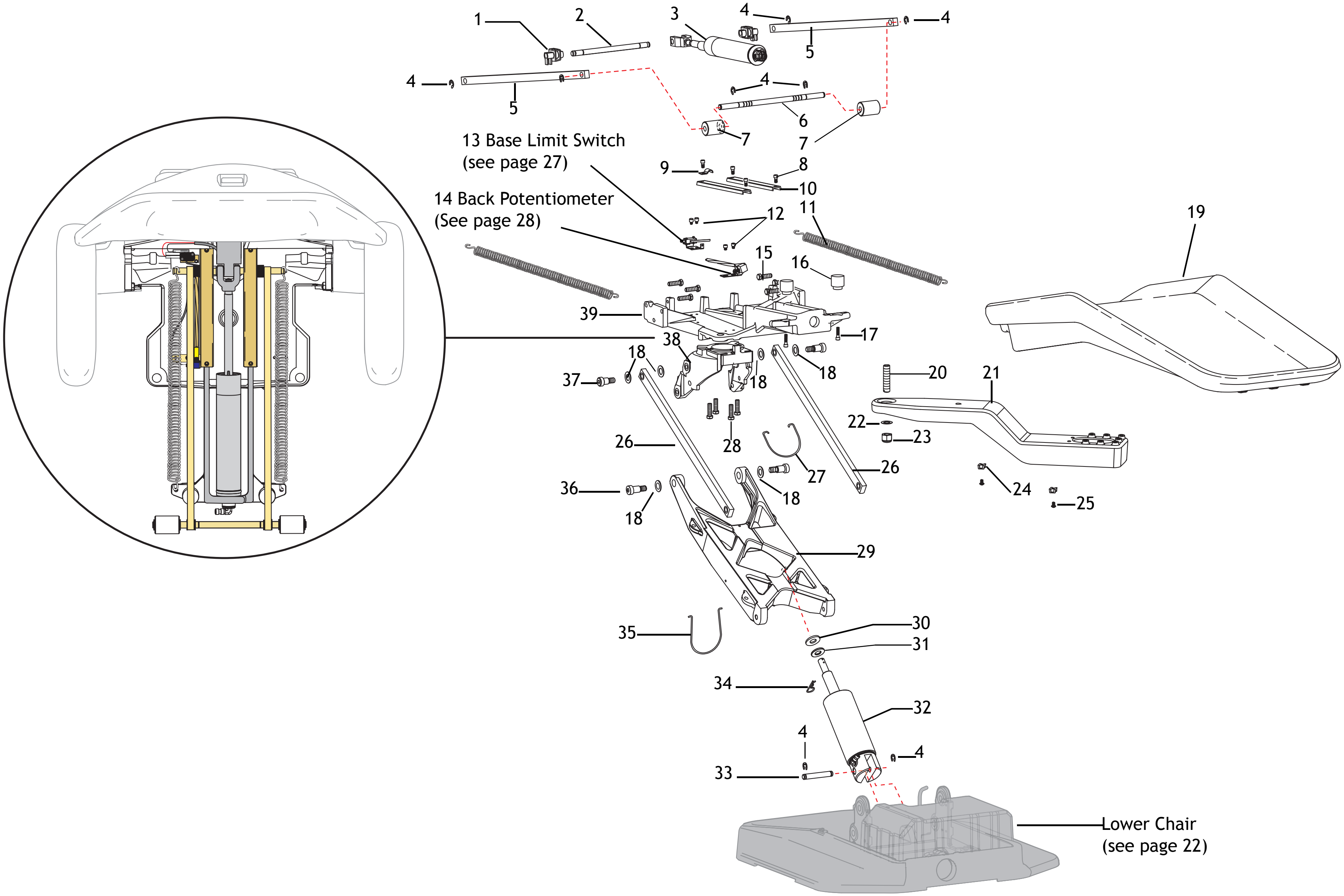
22

Mid Chair Assembly

Item	Part Number	Description	Item	Part Number	Description
1	61.1309.00	Tilt slide block	21	35.1749.00	Chair mount adaptor
2	61.1311.00	Tilt cylinder clevis rod	22	004.171.00	Thrust washer
3	61.1267.00	Tilt cylinder assembly	23	006.124.00	5/8-18 UNF-2B ESNA 4N zinc
4	010.031.00	E-clip	24	025.072.00	Cable tie mounting block
5	61.2076.00	Roller arm link	25	005.143.00	Button head socket screw, 1/4-20 X 3/8"
6	61.2078.00	Toeboard axle	26	61.1294.00 †	Lower structure link
7	61.2293.00	Linkarm roller	27	41.1145.00	Umbilical support
8	005.008.01	Socket head screw, 1/4-20 X 1/2"	28	41.1143.00	Umbilical restraint
9	025.044.00	Clamp	29	61.2095.00 †	Lift arm
10	61.1308.00	Channel guide	30	004.149.00	Flat neoprene washer, .680 ID
11	013.054.00	Spring	31	004.104.00	Flat steel plated washer, .640 ID
12	002.134.00	Socket head screw, 1/4-20 X 1/4"	32	—	Lift cylinder
13	61.1221.00	Base limit switch assembly	33	61.1285.00	Lift pin
14	61.1224.00	Back position potentiometer assembly	34	011.046.00	Clip pin
15	002.023.00	Head screw, 3/8-16 X 1-1/4	35	41.1144.00	Umbilical retainer
16	61.1314.00	Wear pad	36	001.165.00	Socket head shoulder screw
17	002.120.00	Socket head patch screw, 1/4-20 X 1" stainless steel	37	001.164.00	Socket head shoulder bolt
18	004.148.00	Flat nylatron washer, .630 ID	38	61.3825.00 †	Swivel bracket
19	—	Seat armature	39	61.3826.00 †	Upper structure, gray 3
20	61.1270.00	Stud			

† Indicates that the individual part is not available for sale

Figure 20. Mid Chair Assembly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13 Base Limit Switch
(see page 27)
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14 Back Potentiometer
(See page 28)
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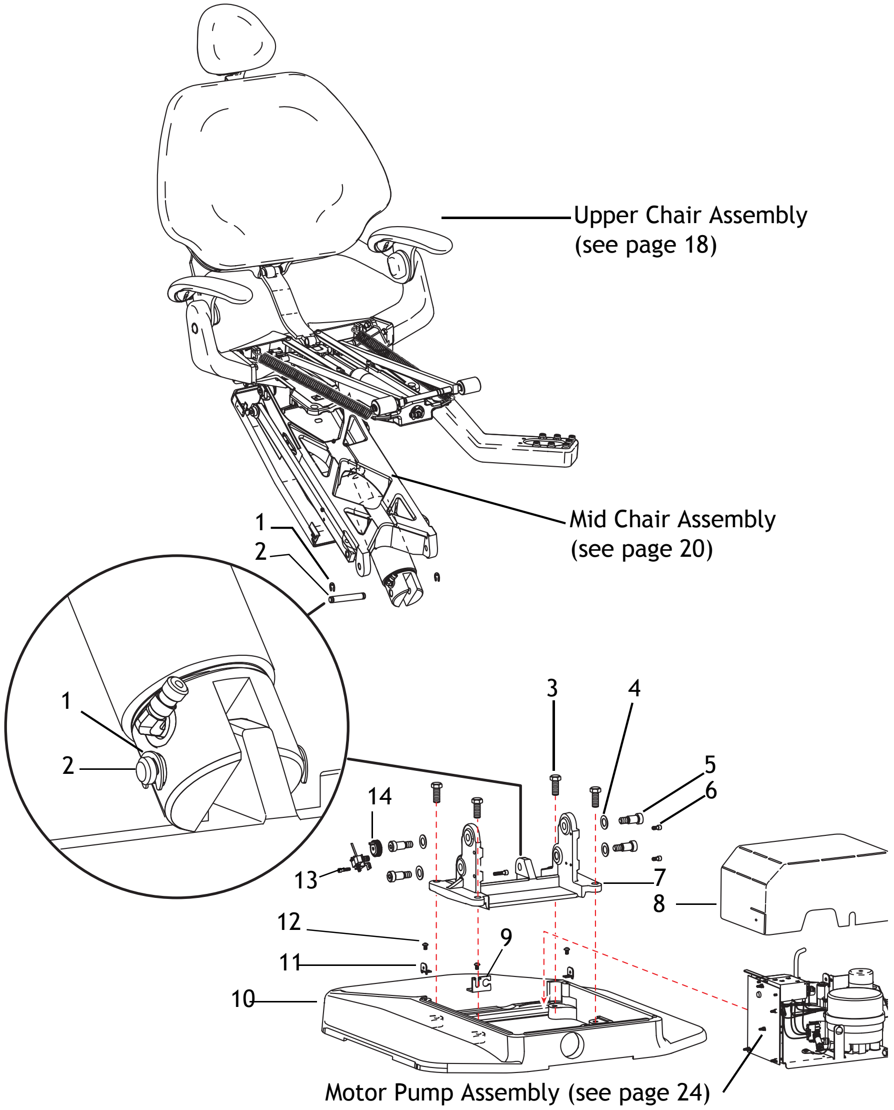
33
Lower Chair
(see page 22)

Lower Chair Assembly

Item	Part Number	Description
1	010.031.01	E-clip
2	61.1285.00	Pivot pin
3	001.163.00	Hex head cap screw, 1/2-13 X 1-1/4
4	004.148.00	Flat nylatron washer, .630 ID
5	001.165.00	Socket head shoulder screw
6	005.008.01	Socket head screw, 1/4-20 X 1/2
7	61.1277.01 †	Sub base
8	61.3848.00	Floorbox/pump cover
9	61.1650.00	Foot switch/foot control bracket
10	61.2037.01	Baseplate
11	61.1286.00	Bracket
12	005.143.00	Button head socket screw, 1/4-20 X 3/8
13	61.1221.00	Base position potentiometer assembly
14	61.1295.00	Gear

† Indicates that the individual part is not available for sale

Figure 21. Lower Chair Assembly


Upper Chair Assembly
(see page 18)
Mid Chair Assembly
(see page 20)
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10
Motor Pump Assembly (see page 24)

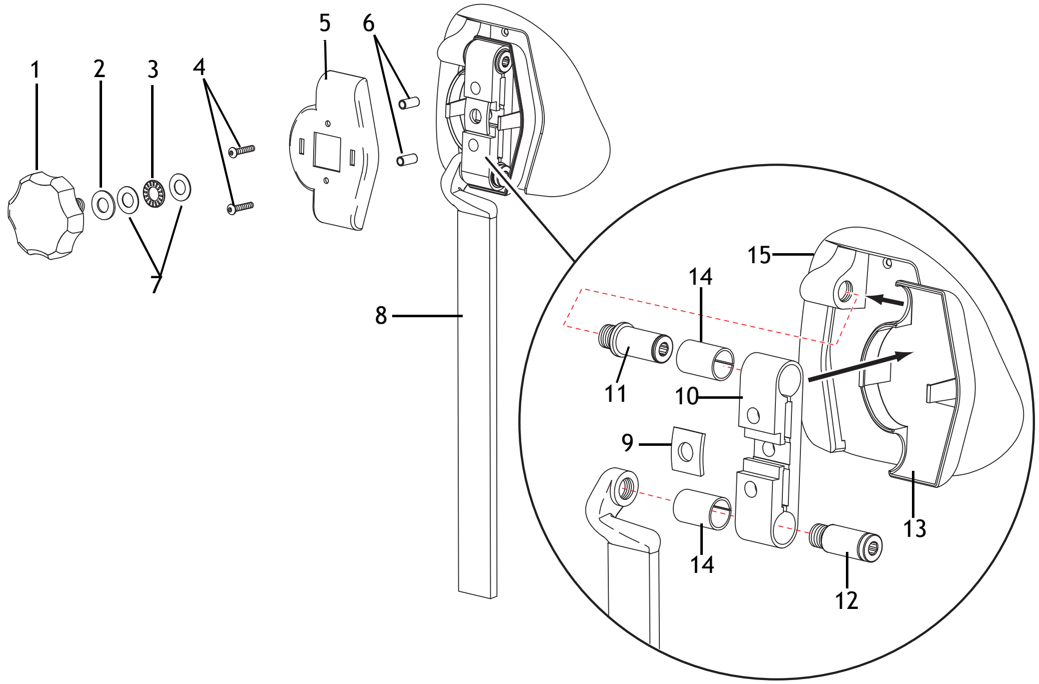
Headrest Assembly

Item	Part Number	Description	Item	Part Number	Description
1	61.1232.02	Knob, locking headrest	9	61.2121.00	Clamp bar
2	004.061.00	Washer	10	61.2190.00	Pivot block
3	016.129.00	Bearing, thrust needle, .500 ID	11	61.2248.00	Pivot shaft
4	005.124.00	Button head screw, 10 - 32 x 1	12	61.2338.00	Pivot pin
5	61.3762.01	Cover, front	13	61.3762.01 *	Rear cover
6	61.2172.00	Tube spacer	14	61.0816.00	Bushing
7	004.136.00	Washer, thrust bearing, .500 ID	15	61.2267.00	Cushion back cover
8	61.1272.00 †	Glidebar			

† Indicates that the individual part is not available for sale

* Sold as a matching set

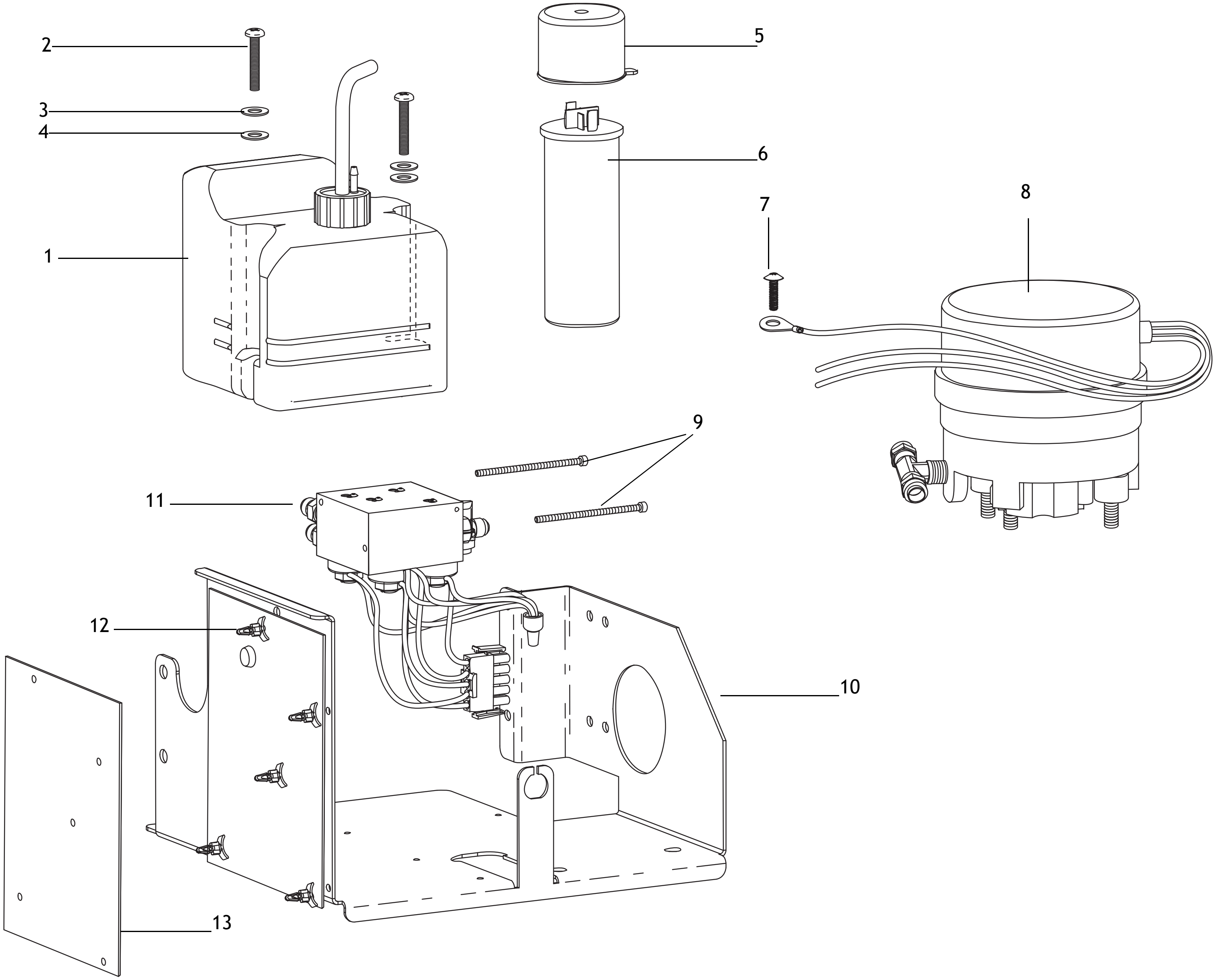
Figure 22. Headrest Assembly



Motor Pump and Capacitor Assembly

Item	Part Number	Description
1	61.1339.00	Hydraulic tank
2	002.052.00	Pan head phillips screw, 10-32 X 3/8
3	004.118.00	Nylatron washer, .188 ID
4	004.230.00	Stainless steel washer, .203 ID
5	041.529.00	Boot
6	041.627.00	Capacitor, 50 UF 240 V, 50/60 HZ
7	001.164.00	Screw
8	61.1327.00 61.1328.00	Motor pump assembly, 100/100-115 V Motor pump assembly, 240 V
9	002.100.01	Socket head screw, 6-32 X 1-1/4
10	61.1338.00	Motor pump tray
11	61.1332.00 61.1333.00 61.1334.00	Hydraulic manifold assembly, 100 Volt Hydraulic manifold assembly, 120 Volt Hydraulic manifold assembly, 240 Volt
12	041.428.00	Standoff
13	90.1029.02	Chair circuit board, 100-240 Volt

Figure 23. Motor Pump and Capacitor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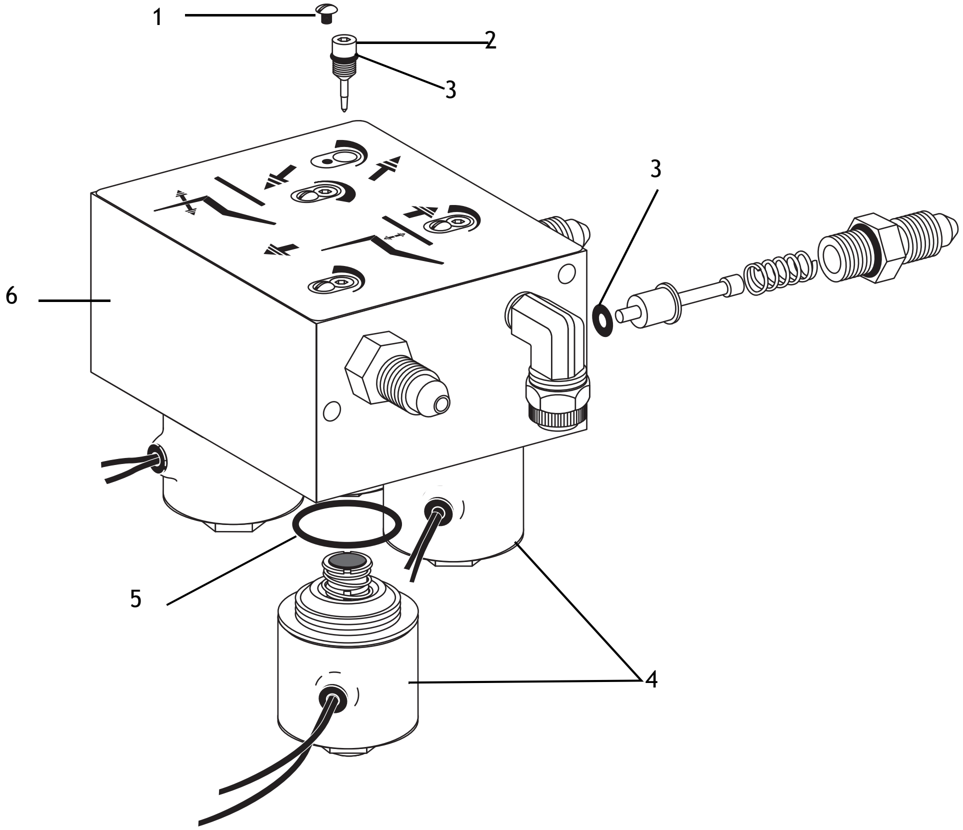
Hydraulic Manifold Assembly

Item	Part Number	Description	Item	Part Number	Description
1	002.118.02	Screw, button head socket	4	61.1335.00 61.1336.00 61.1337.00	Solenoid, 8-watt, 100 V, yellow wires Solenoid, 8-watt, 120V, black wires Solenoid, 8-watt, 240 V, red wires
2	61.0460.00	Flow adjust screw with o-ring	5	030.015.02	O-ring, package of 10
3	030.004.02	O-ring, AS568-004 package of 10	6	61.1333.00 61.1334.00	Manifold assembly, hydraulic, 120 V Manifold, assembly, hydraulic, 240V

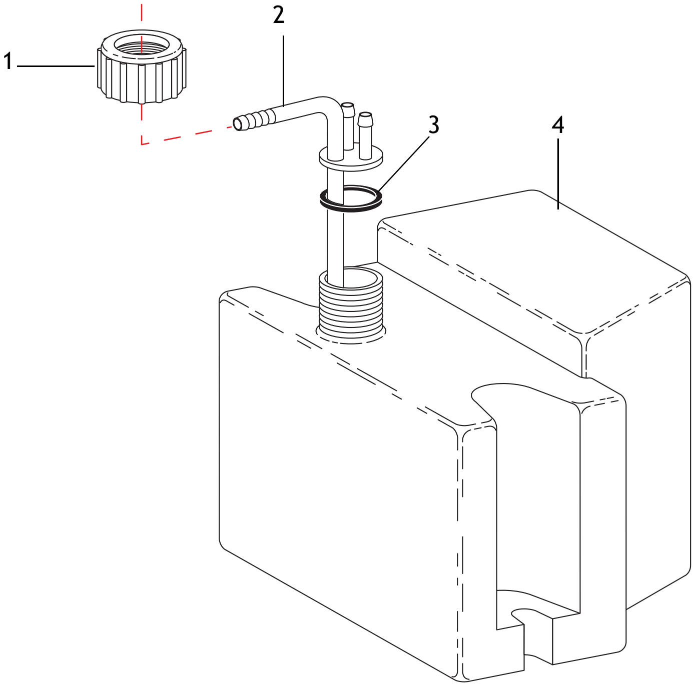
Figure 24. Hydraulic Manifold



Hydraulic Tank Assembly

Item	Part Number	Description
1	006.112.00	Retainer Nut, 3/4"
2	61.1489.00	Pick-Up Tube Solder Assembly
3	004.161.00	Rubber Washer
4	61.1339.00	Hydraulic Tank

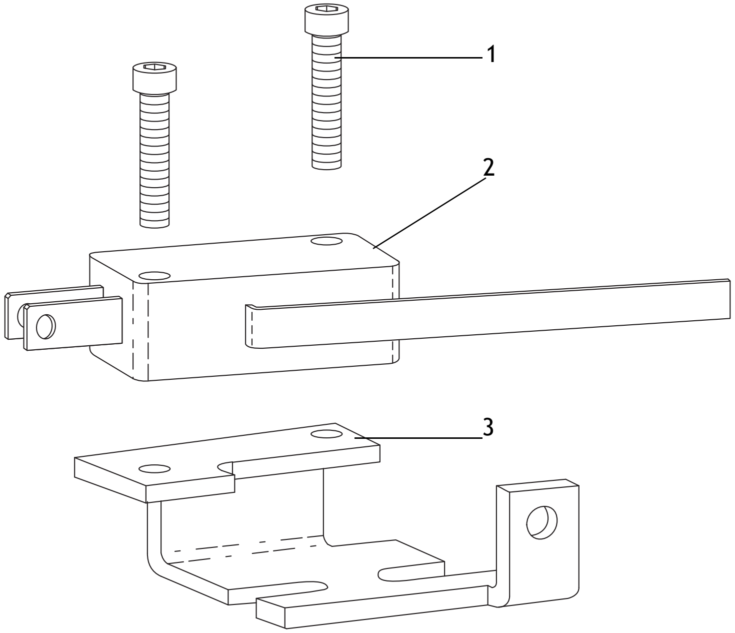
Figure 25. Hydraulic Tank Assembly



Base Limit Switch Assembly

Item	Part Number	Description
1	001.021.00	Socket Head Screw, 4040 X 1/2 Stainless Steel
2	044.184.00	Switch, 15 Amp 125 Volt
3	61.1315.00	Mounting Bracket

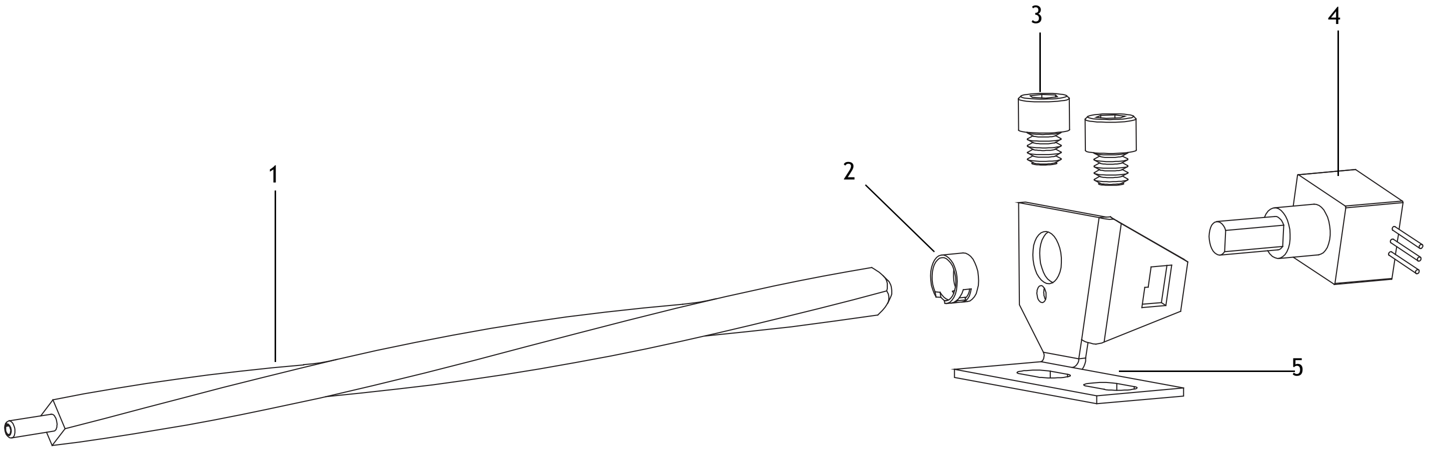
Figure 26. Base Limit Switch Assembly



Back Potentiometer Assembly

Item	Part Number	Description
1	61.1225.00	Helical Drive Shaft
2	025.113.00	Compression ring
3	002.134.00	Socket Head Screw, 1/4-20 X 1/4
4	041.372.00	Potentiometer, 5 K Ohm
5	61.1226.00	Mounting Bracket

Figure 27. Back Potentiometer

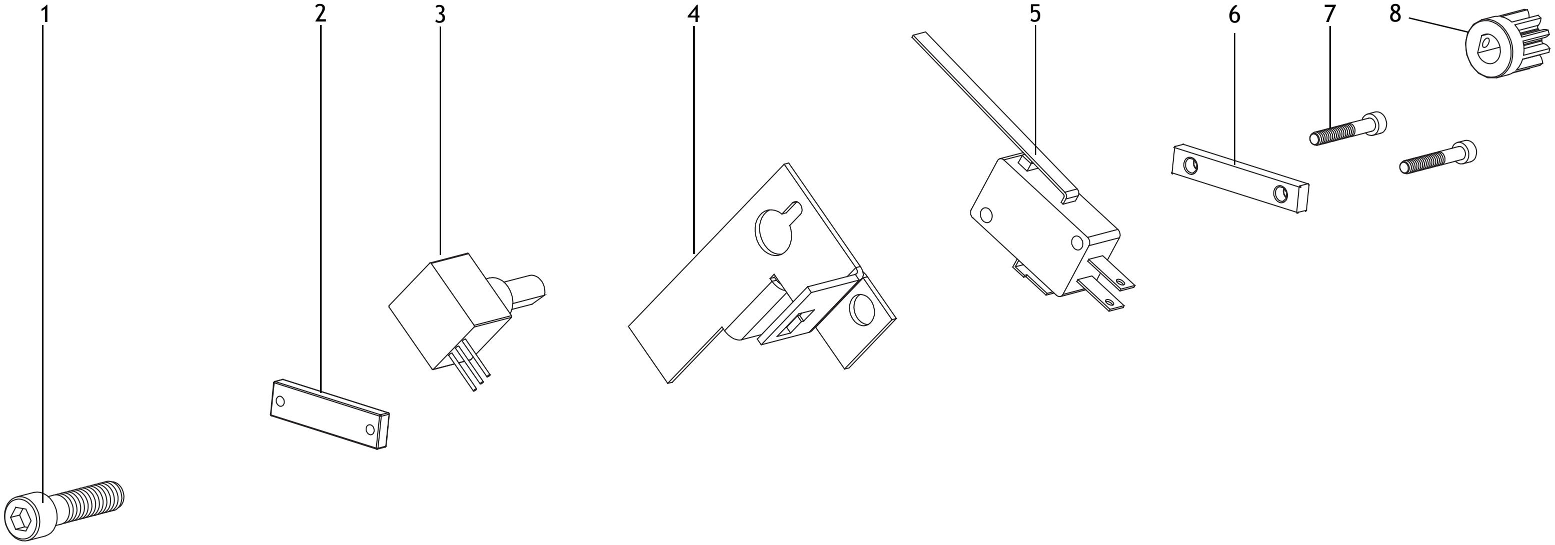


Base Position Potentiometer Assembly

Item	Part Number	Description
1	002.024.00	Socket Head Screw, 4-40 X 3/4
2	60.0080.00	Mounting Plate
3	041.372.00	Potentiometer, 5 K Ohm
4	61.1223.00	Base Position Mounting Bracket
5	044.184.00	Switch, 15 Amp, 125 Volt
6	61.1367.00	Limit Switch Mounting Plate
7	002.120.00	Socket Head Patch Screw, 1/4-20 X 1 Stainless Steel
8	61.2625.00 †	Gear, 10 Tooth, 24 Point

† Indicates that the individual part is not available for sale

Figure 28. Base Potentiometer



3

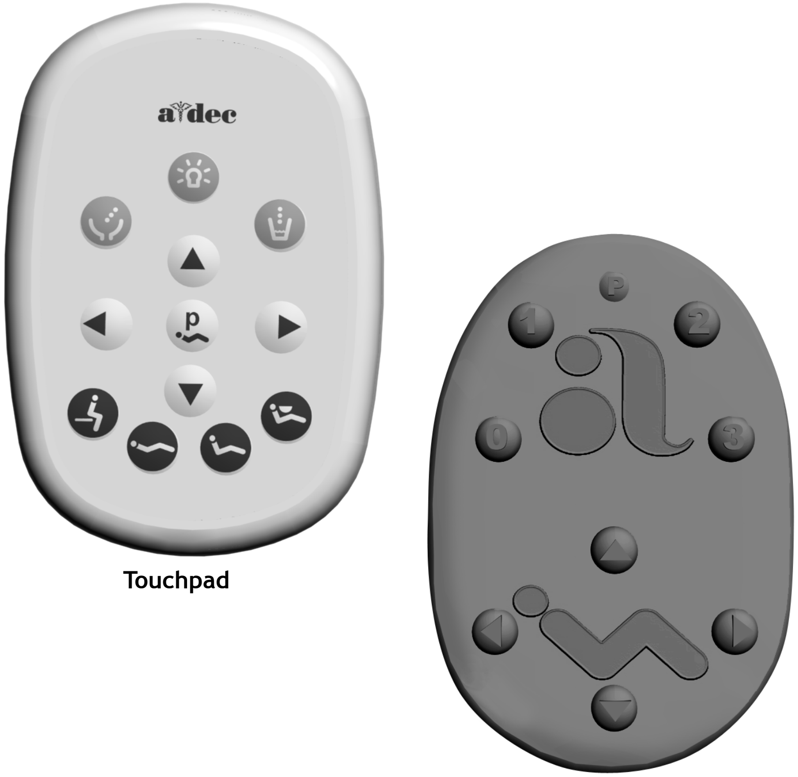
PROGRAMMING

The A-dec 200 product offers the option of having a standard touchpad. The touchpad centralizes treatment room controls into one touch surface including the chair, light, cuspidor controls, and auxiliary equipment.

NOTE

- The A-dec 200 product ships with a non-functioning cuspidor board. If the system has a touchpad and cuspidor, an upgrade to the cuspidor board is required to allow control of the cuspidor functions with the touchpad.
- If the system has a touchpad and dental light, the dental light circuit board is required (located in the floor box) to allow control of the dental light from the touchpad.

Figure 29. Touchpad or Footswitch Programming



Touchpad

Footswitch

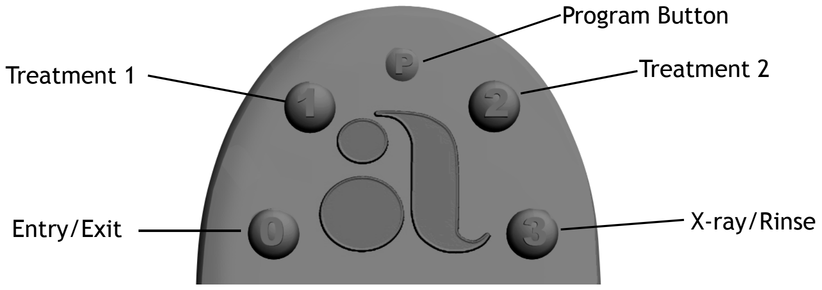
Touchpad Options

The A-dec logo on the touchpad indicates the system status. If it appears as solid blue, the system is on and ready for use.

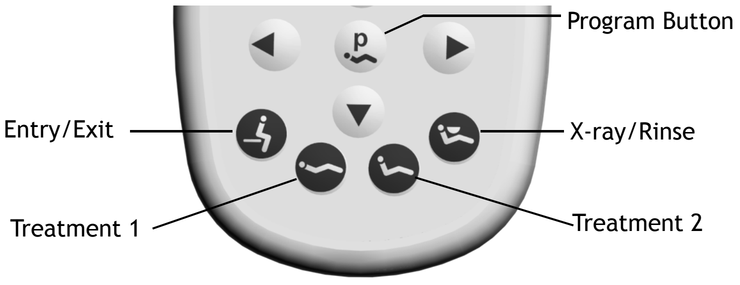
Chair Positions

The chair direction arrows on the standard and deluxe touchpads allow you to manually move the chair base up/down and back up/down. Table lists the icons and the action of each icon.

Figure 30. Chair Position Touchpad Button



Footswitch



Touchpad

Chair Preset Position Buttons

Chair position buttons are factory preset to automatically move the chair (see Figure 30).

Table 4. Chair Preset Positions

Footswitch/Touchpad	Description
0 /	**Entry/Exit:** Positions chair for patient entry/exit. On systems with a doctor's touchpad, it also turns the dental light off.
1 /	**Treatment 1:** Positions the chair base and back down. On systems with a doctor's touchpad, it also turns the dental light on.
2 /	**Treatment 2:** Positions the chair base down and back up. On systems with a doctor's touchpad, it also turns the dental light on.
3 /	**X-ray/Rinse:** Moves the chair for either x-ray or rinse position. Press again to move the chair to the previous position. On systems with a doctor's touchpad, also turns the dental light off or back on.

Chair Preset Buttons

Use the program buttons to assign and save chair preset positions. To program the chair presets Entry/Exit, Treatment 1, and Treatment 2:

1. Use the manual controls to adjust the chair position as desired.
2. Press and release the Program button. One beep indicates programming mode is on.
3. Within four seconds, press the chair position button you wish to reset (for example 1 and). Three beeps indicate the new setting is programmed into memory.

X-Ray/Rinse Button

The x-ray/rinse preset button moves the chair and patient into an upright position for x-rays or cuspidor access. To change the function to an additional programmable chair position:

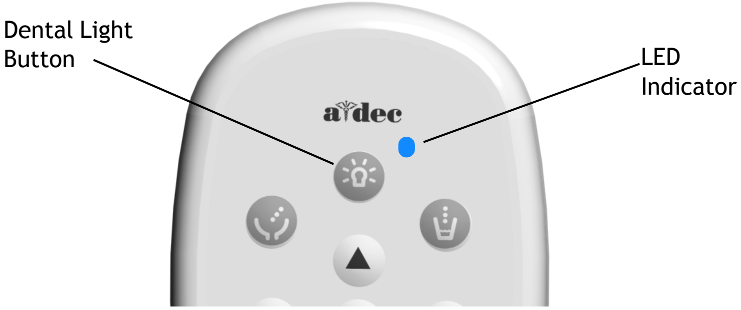
1. On the touchpad or footswitch, press and hold the power button and the x-ray/rinse button at the same time for three seconds.
   - ○ One beep indicates the button can be configured as Treatment 3.
   - ○ Three beeps indicate that the X-ray/Rinse button has been configured as the x-ray/rinse function (toggles between x-ray/rinse and the previous position).
2. Program the preset position as instructed under "Chair Positions" on page 32.

TIP If the X-ray/Rinse button is changed to a preset position, it operates the same as treatment buttons 1 and 2.

Dental Light

The dental light can be operated from the manual 3-position switch or the optional touchpad. To operate the touchpad, press and hold the button to turn the light off. Press the light button to choose between two intensities. When the light is in the composite setting, the LED indicator on the touchpad flashes.

Figure 31. Dental Light Operation



Auto On/Off

The optional auto on/off feature turns on the light when the chair back reaches a treatment position. Press ● or ● and the dental light turns off.

To disable the auto on/off feature, press and hold P and ☼ simultaneously for three seconds. One beep confirms the dental light on/off function is off.

To enable the auto on/off feature, press and hold P and ☼ simultaneously for three seconds. Three beeps confirm the auto on/off feature is activated.

Cuspidor Cupfill and Bowl Rinse

The cuspidor cupfill and bowl rinse functions are dependent upon your specific configuration.

Standard Cuspidor *(no touchpad)*

Press and hold the cupfill button on the cuspidor for the desired amount of water. Water will continue to flow until the button is released.

Press the bowl rinse button on the cuspidor once for a 10-second rinse. For continuous rinse, hold the button down. When the button is released, the water will continue to flow for 10 additional seconds.

Cuspidor with Optional Touchpad

If your system includes a touchpad, you can use the buttons on the touchpad or the cuspidor to operate and program bowl rinse and cupfill functions:

Table 5. Cupfill and Bowl Rinse Functions

Button	Description
	Cupfill Button: • Press the Cupfill button for a timed operation. The factory preset is a 2.5 second fill. • Press and hold the Cupfill button for manual operation.
	Bowl Rinse Button: • Press the Bowl Rinse button for a timed operation. The factory preset is a 30 second rinse. • Press and hold the Bowl Rinse button for manual operation.

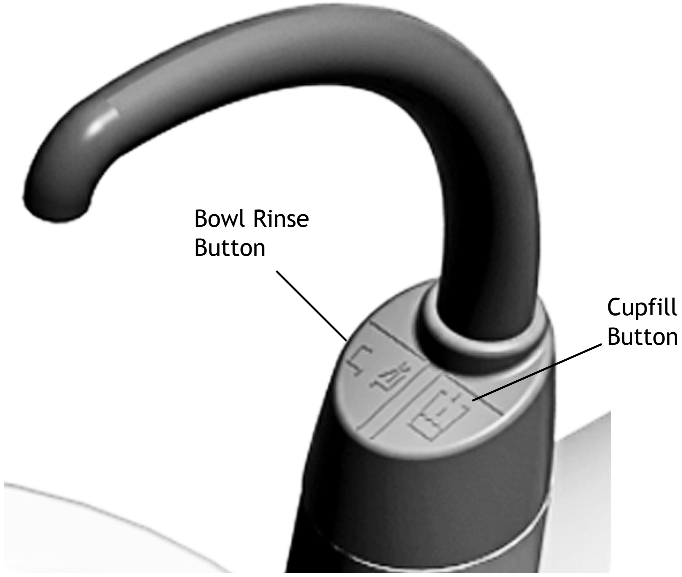
Customize Cupfill and Bowl Rinse Functions

Perform this operation with the doctor's touchpad only.

1. Press on the touchpad or press and hold both the cupfill and bowl rinse buttons on the cuspidor (see Figure 32). Release them when you hear one beep.
2. Press and hold the Cupfill () or Bowl Rinse () button for the desired amount of time.
3. Release the button. Three beeps confirm the setting.

TIP Press twice in less than two seconds to activate the continuous operation mode. Press the button once to end the continuous bowl rinse mode.

Figure 32. Cuspidor Tower Cupfill and Bowl Rinse Buttons



DELIVERY SYSTEM

This section provides information related to service, maintenance, and adjustments of the A-dec 200 delivery system.

Contents

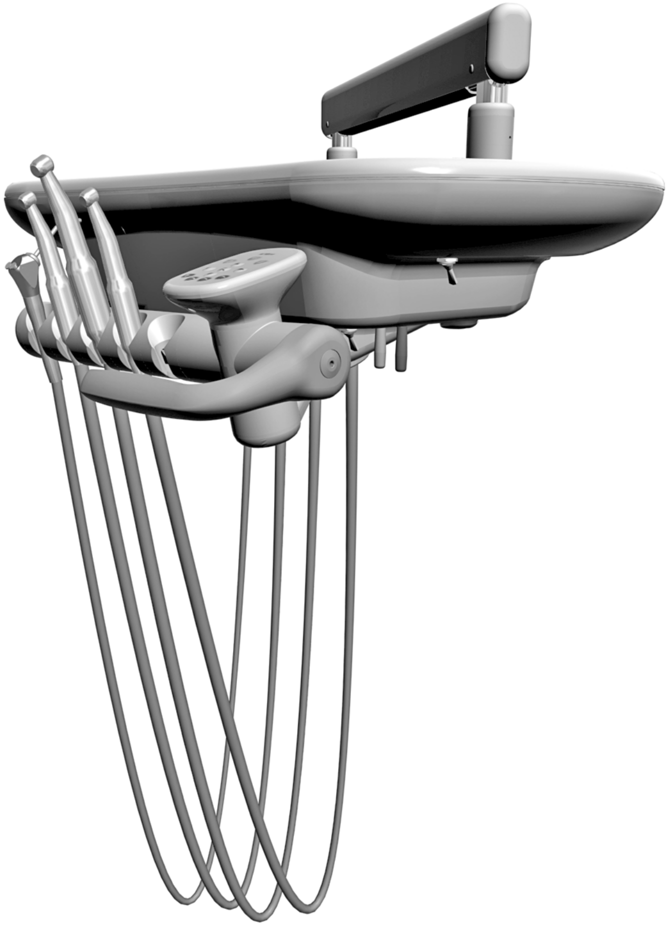
- Product Overview, page 35
- Service, Maintenance, and Adjustments, page 37
- Illustrated Parts Breakdown, page 47

Product Overview

A-dec 200 delivery system has been designed to mount on the A-dec 200 Support Center. The support center mounts to the chair using a post mount. The A-dec 200 delivery system provides the air and water used to operate the handpieces, syringes and accessories, and electrical power and data control of other modules.

The A-dec 200 standard configuration has a balanced flexarm with manual brake, three handpiece control block positions (3-position block is standard), a control head with room to house integrated accessories, and an autoclavable syringe.

Figure 33. A-dec 200 Delivery System



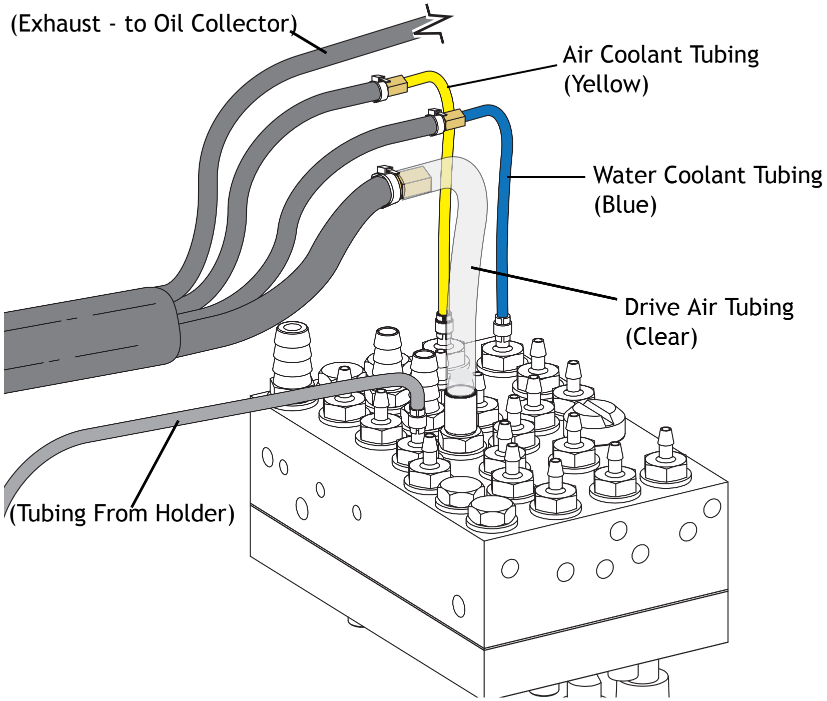
A-dec Tubing

A-dec products use four sizes of outside diameter tubing: 1/8", 1/4", 3/8", and 5/16". The A-dec 200 delivery system uses standard A-dec tubing and vinyl handpiece tubing. See "Tubing and Flow Diagrams" on page 109 to identify tubing. See "Handpiece Tubing Replacement" on page 42 for instructions on replacing tubing.

Table 6. A-dec Handpiece Tubing Cross Reference Table

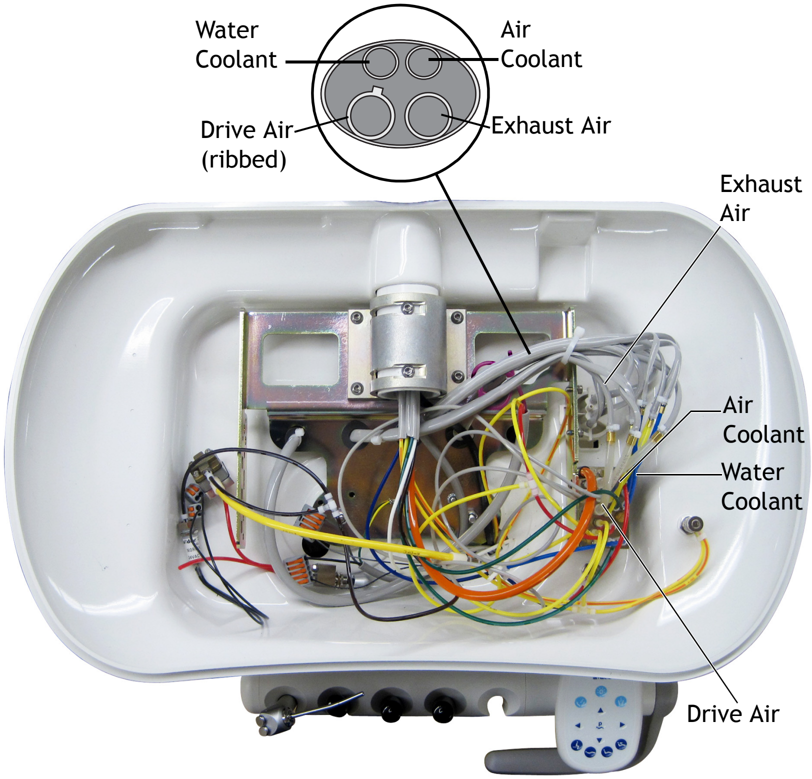
Color	Function
Clear	Drive air
Blue	Water coolant
Yellow	Air coolant

Figure 34. A-dec Handpiece Tubing Identification


(Exhaust - to Oil Collector)
Air Coolant Tubing (Yellow)
Water Coolant Tubing (Blue)
Drive Air Tubing (Clear)
(Tubing From Holder)

The handpiece tubing connects to the control block using tubing connectors and the appropriate A-dec tubing.

Figure 35. Vinyl Handpiece Tubing Control Block Connections


Water Coolant
Air Coolant
Drive Air (ribbed)
Exhaust Air
Exhaust Air
Air Coolant
Water Coolant
Drive Air

Service, Maintenance, and Adjustments

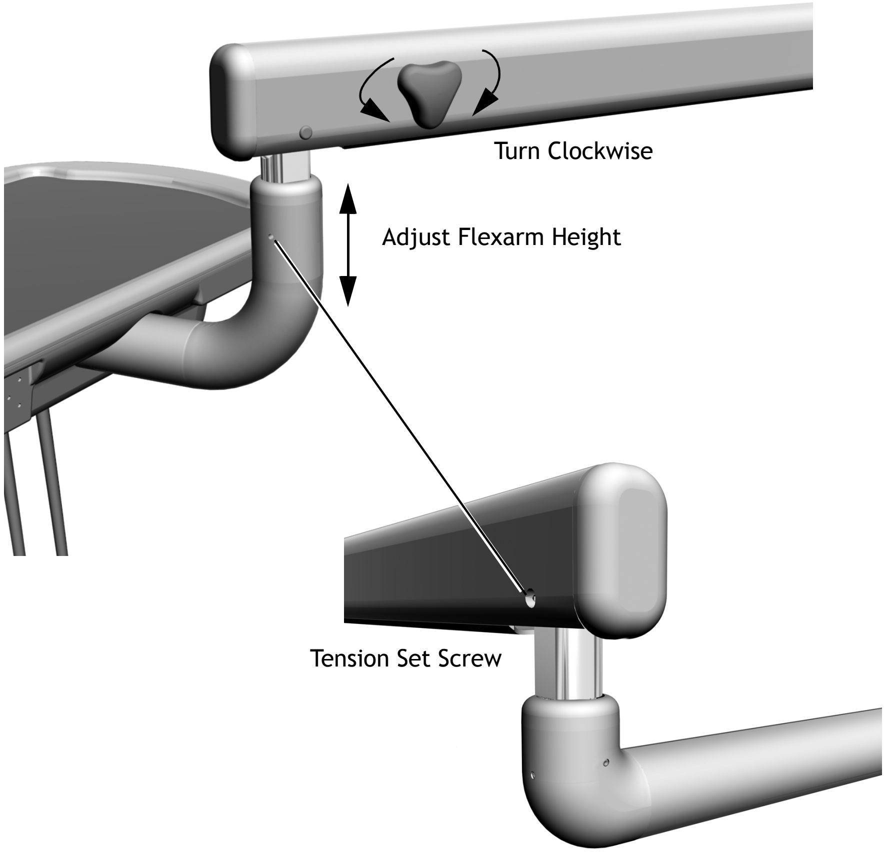
Contents

- Flexarm Adjustments, page 37
- Instrument Holder Adjustments, page 38
- Control Block, page 39
- Handpiece Control Adjustments, page 40
- Oil Collector, page 41
- Handpiece Tubing Replacement, page 42
- Quad Voltage Intraoral Light Source (QVIOLS), page 43
- Intraoral Light Source Length and Voltage, page 45

Flexarm Adjustments

- Tension: If the control head flexarm drifts right or left, use a 3/32" hex key to adjust the tension setscrew. Turn the screw clockwise to tighten or counterclockwise to loosened the tension.
- Height: Turn the knob counterclockwise to disengage the flexarm brake and adjust the height. Turn the knob clockwise to lock the position.

Figure 36. Flexarm Adjustments

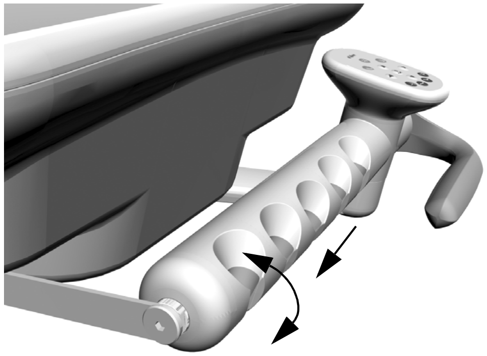


Instrument Holder Adjustments

Rotate the holders independently. Pull the holder slightly away from the adjacent one, rotate to the desired position, then release.

⚠ **CAUTION** Twisting the holder without pulling it away from the adjacent one will damage the mechanism.

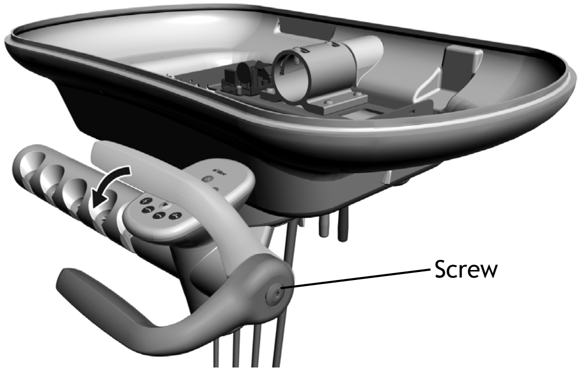
Figure 37. Doctor's Holder Adjustments



Handle

To position the handle, remove the screw at the end of the handle, adjust the handle for use, then replace and tighten the screw.

Figure 38. Handle Adjustment



Control Block

The control block might need to be removed to service the control head. For example, you many need to remove the control block to change a diaphragm, to change a cartridge, or to service o-rings.

Remove the Control Block

1. Remove the cover.
2. Loosen and remove the two screws a that secure the control block to the control delivery system frame.
3. Lift the control block up from the base of the control center.

Figure 39. Remove Control Top

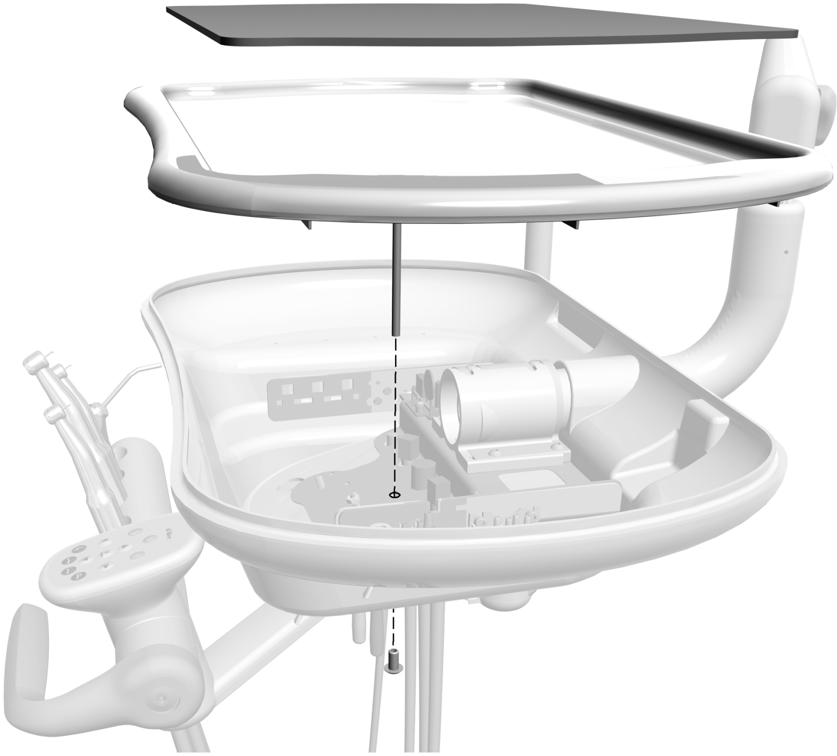
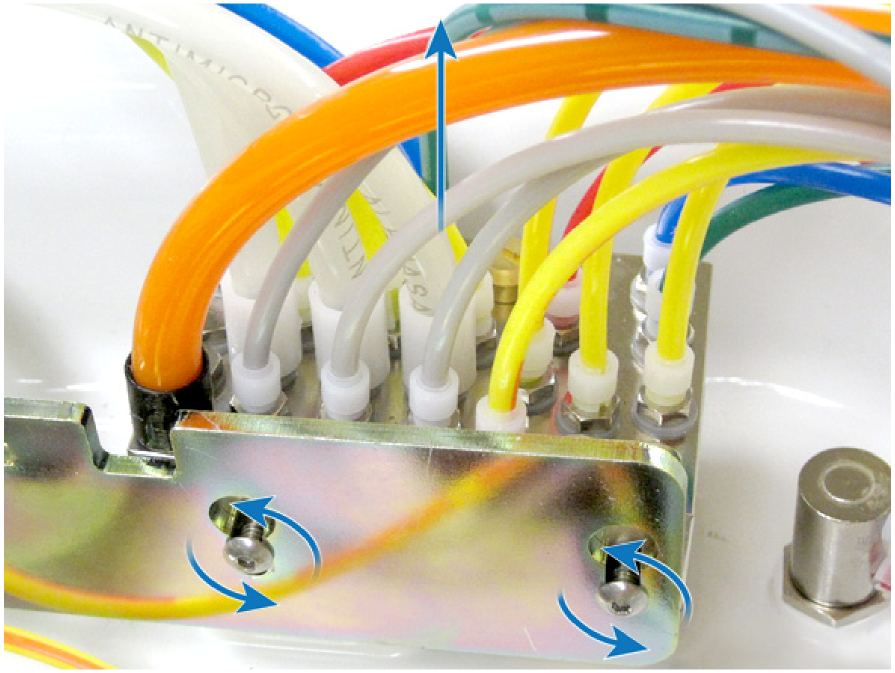


Figure 40. Remove Control Block on Delivery Systems

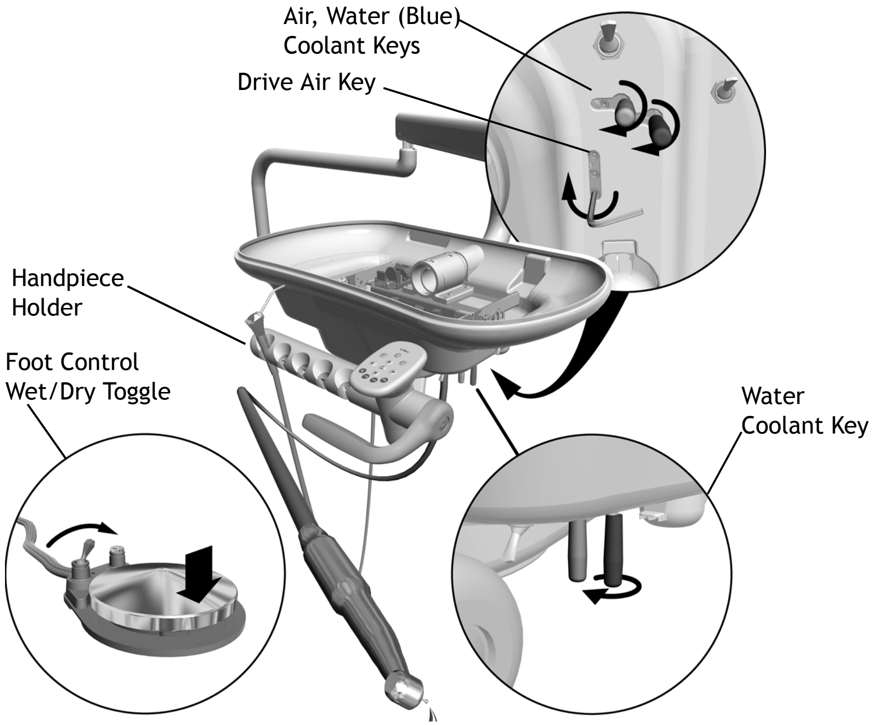


Handpiece Control Adjustments

Adjust the Water Coolant

1. Turn the air coolant, water coolant, and drive air all the way down.
2. Lift a handpiece from the holder, and flip the wet/dry toggle to water (towards the blue dot).
3. Step on the foot control.
4. Adjust the water coolant flow until there is 1 drop every 2 seconds.

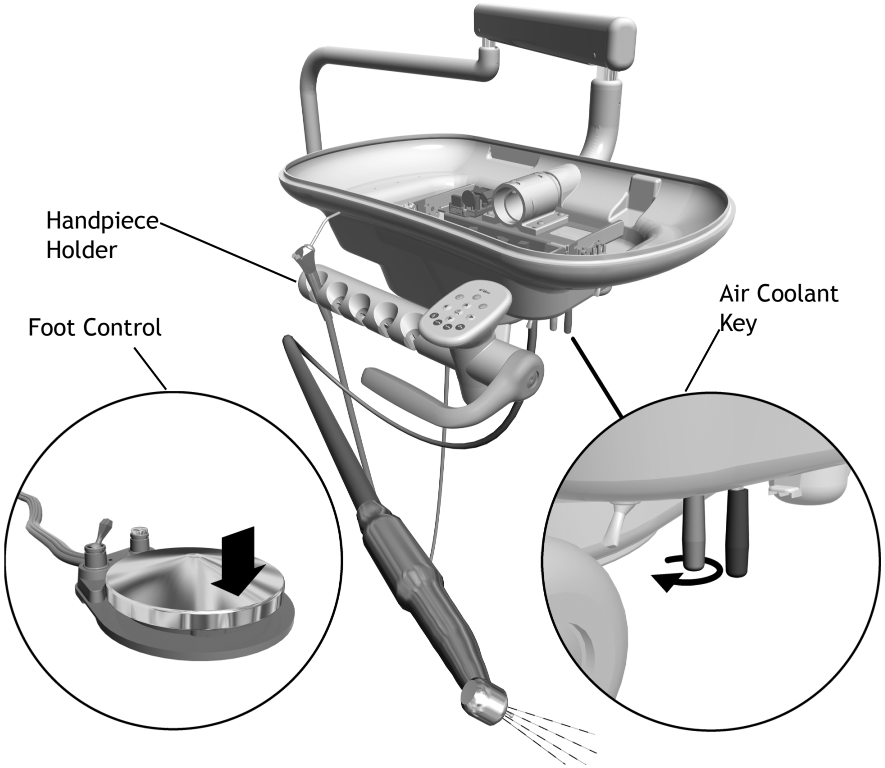
Figure 41. Adjust Water Coolant


Air, Water (Blue)
Coolant Keys
Drive Air Key
Handpiece
Holder
Foot Control
Wet/Dry Toggle
Water
Coolant Key

Adjust the Air Coolant

1. Lift a handpiece from the holder, and step on the foot control.
2. Adjust the air coolant flow until the spray is a fine mist.

Figure 42. Adjust Air Coolant


Handpiece
Holder
Foot Control
Air Coolant
Key

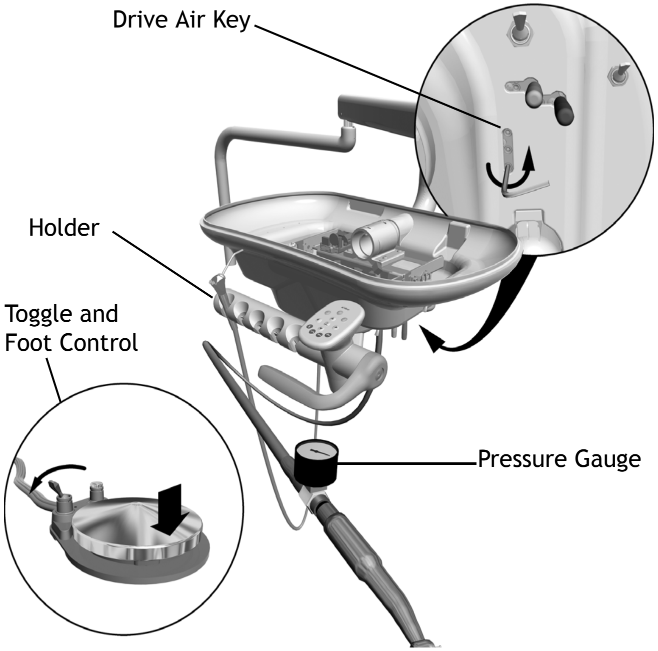
NOTE Contact A-dec Customer Support for information on servicing the foot control or syringe. See "Get Support" on page 1.

Adjust the Drive Air Pressure

NOTE Use a handpiece pressure gauge attached to the handpiece tubing for exact drive air measurement. See the manufacturer's handpiece documentation for the drive air pressure specification.

1. Lift a handpiece from the holder.
2. Install a pressure gauge.
3. Flip the toggle to dry, and step on the foot control.
4. Adjust the drive air pressure according to manufacturer's recommendations.
    - To increase flow, turn the key counterclockwise.
    - To decrease flow, turn the key clockwise.

Figure 43. Adjust Drive Air Pressure



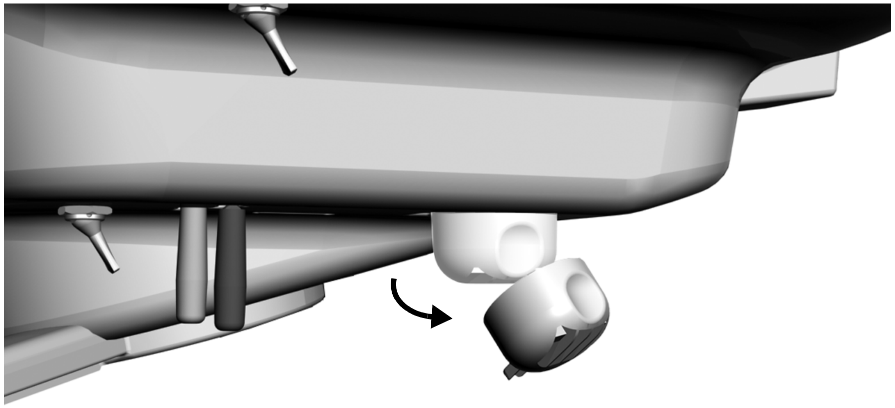
Oil Collector

The oil collector needs to be serviced once a week for normal use and more often for heavier use. To service:

1. Unsnap the oil collector cover located under the control head and discard the old gauze.

CAUTION Do not remove the foam pad located inside the oil collector cover.

Figure 44. Oil Collector Removal



2. Fold a new gauze pad (51 mm x 51 mm [2" x 2"]) into quarters and place inside cover.
3. Snap the oil collector cover closed.

Handpiece Tubing Replacement

1. Remove the delivery system cover.
2. Cut the handpiece tubing you are replacing from the colored A-dec tubing/control block.
3. Pull the old handpiece tubing out of the control head.
4. Route the new handpiece tubing through the base of the control head.
5. Connect the new handpiece tubing to the control block using the connectors and colored tubing previously used.

The A-dec colored tubing is identified by it's color (see bullets below and Figure 35).

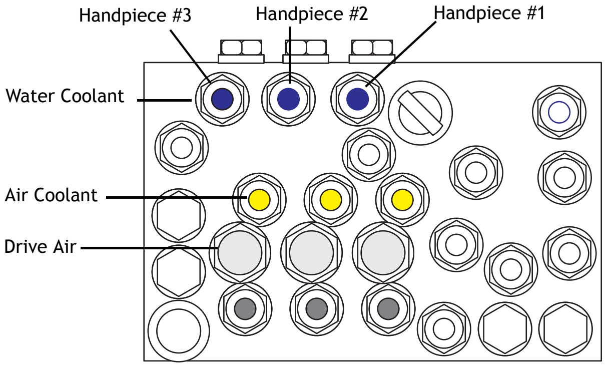
- Yellow tubing to the air coolant port
- Blue tubing to the water coolant port
- Clear tubing to the drive air port

NOTE Vinyl tubing is not color coded. For vinyl tubing identification, see Figure 35 on page 36.

---

6. Replace the delivery system cover.

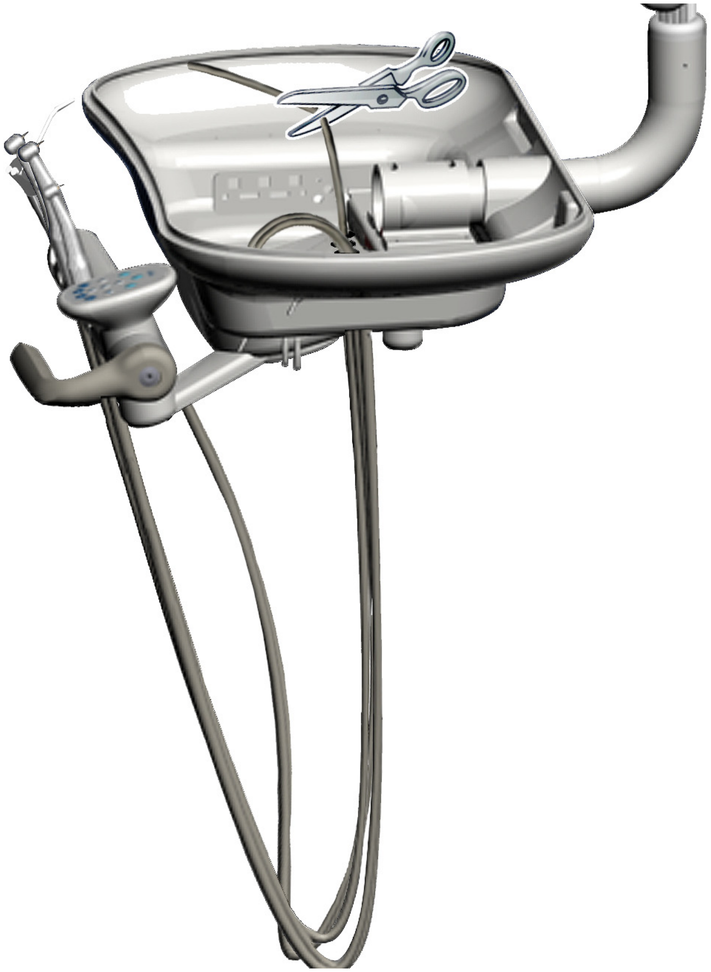
Figure 45. Handpiece Barb Connection



Adjust Tubing Length

1. Adjust the length of the tubing so it drapes with syringe tubing.
2. Insert the tubing in the tubing retainers.

Figure 46. Adjust Length of Handpiece Tubing



Quad Voltage Intraoral Light Source (QVIOLS)

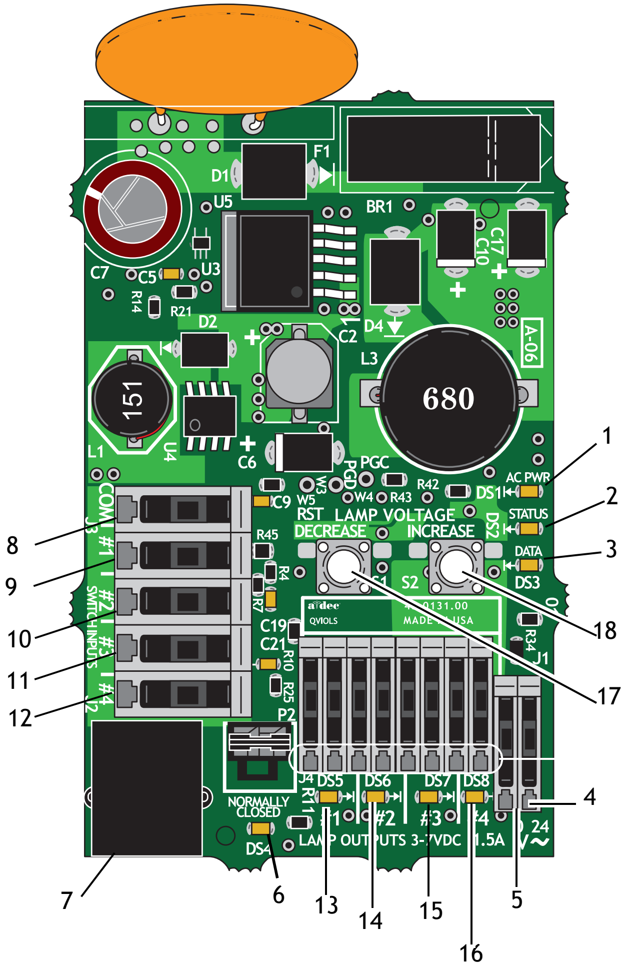
Part Number: 90.1168.00

The quad voltage intraoral light source (QVIOLS) provides four independent fiber optic voltage outputs. Each output is adjustable from 3VDC to 7VDC at 1.5 Amps. Only one output can be on at a time. Activating an input on the QVIOLS turns on its respective output.

Table 7. QVIOLS Circuit Board Descriptions

Item	Description
1	DS1 AC Power LED
2	DS2 Status LED
3	DS3 Data LED
4	J1 - 24VAC Input
5	J1 - 0VAC Input
6	P2 - DS4 - normally closed jumper
7	P1 Data Port
8	J3 Switch input Common
9	J3 Switch Input #1
10	J2 Switch Input #2
11	J2 Switch Input #3
12	J2 Switch Input #4
13	J4 Light Source Output #1
14	J4 Light Source Output #2
15	J5 Light Source Output #3
16	J5 Light Source Output #4
17	S1 Decrease Lamp Output
18	S2 Increase Lamp Output

Figure 47. QVIOLS Circuit Board



1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
680
151
AC PWR
DS1
STATUS
DS2
DATA
DS3
LAMP VOLTAGE
DECREASE
INCREASE
RST
S2
J1
P2
NORMALLY CLOSED
DS4
DS5
DS6
DS7
DS8
#1
#2
#3
#4
LAMP OUTPUTS 3-7VDC 1.5A
24 V~
COM
J3
J2
SWITCH INPUTS

NOTE On the A-dec 200 product, a jumper should always be located within P2, and DS4 should be On.

Intraoral Light Source Adjustments

The intraoral light source (IOLS) voltage adjustment on the A-dec 300 doctor's delivery system is located on the QVIOLS circuit board. Each output voltage is preset to 3.2VDC at the lamp terminals when the lamp is on.

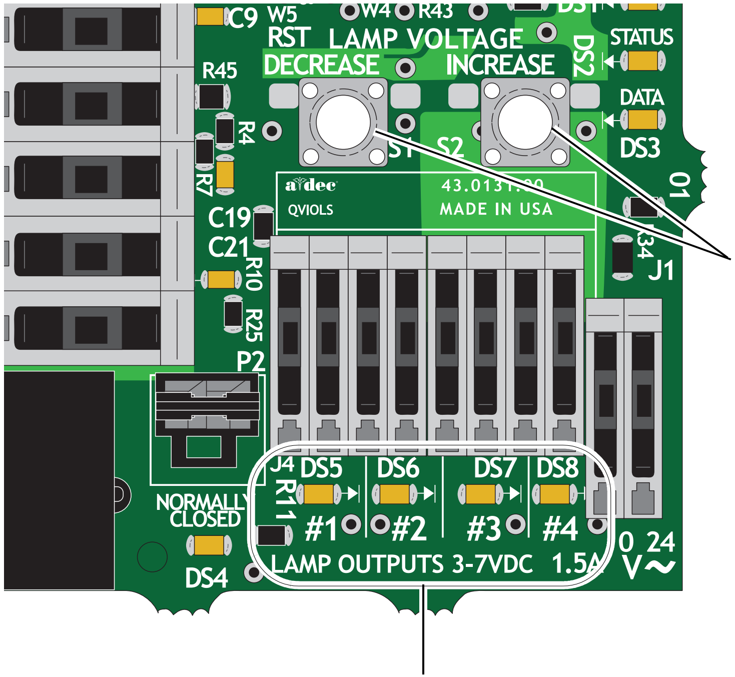
WARNING The Length and Voltage Table, page 45, is only valid for devices rated for 3.5 VDC and 0.75 Amp 26AWG wires. For devices drawing a different amount of current, requiring a different voltage, or with a different wire gauge, please contact A-dec Customer Service. (See "Get Support" on page 2.)

1. Use a 7/64" hex key to remove the control head cover.
2. Set the voltmeter to DC voltage and place its probes on the IOLS output terminals for the handpiece you are testing.
3. Lift the handpiece from its holder.

NOTE When the intraoral light source output is On, its respective LED is On. for example, LED DS6 is On when handpiece #2's intraoral light source is activated.

4. Use the buttons behind the terminal to adjust the voltage according to the Length and Voltage Table, page 45.

Figure 48. Intraoral Light Source Voltage


C9
W5
W4
R43
RST LAMP VOLTAGE
DECREASE
INCREASE
STATUS
DATA
DS2
DS3
R45
R4
R7
S1
S2
a-dec
QVIOLS
43.0131.00
MADE IN USA
C19
C21
R10
R25
P2
J1
NORMALLY CLOSED
DS4
J4
R11
DS5
DS6
DS7
DS8
#1
#2
#3
#4
LAMP OUTPUTS 3-7VDC 1.5A
0 24
V~

Decrease and Increase Buttons

Intraoral Light Source Outputs

Intraoral Light Source Length and Voltage

Table 8. Length and Voltage Table

Length and Voltage					
Wire length in A-dec tubing		Voltage at terminal strip A-dec/W&H, Bien Air or other bulbs rated at 3.5V	Wire length in A-dec tubing		Voltage at terminal strip A-dec/W&H, Bien Air or other bulbs rated at 3.5V
(in)	(cm)	VDC +/- .02	(in)	(cm)	VDC +/- .02
48	122	3.40	108	274	3.69
54	137	3.43	114	290	3.72
60	152	3.46	120	305	3.75
66	168	3.49	126	320	3.78
72	183	3.52	132	335	3.81
78	198	3.55	138	351	3.84
84	213	3.58	144	366	3.87
90	229	3.61	150	381	3.90
96	244	3.64	156	396	3.93
102	259	3.67			

NOTE Table 8 pertains to fiber-optics powered with 26AWG wires, 0.75 Amp loads, and a desired bulb voltage of 3.2 VDC. For fiber-optics powered with 26AWG wires and other ratings, use the equation:

T = (Z x 0.006 x Y) + X where:

T: Terminal strip voltage(VDC)
X: Desired voltage at lamp (VDC)
Y: Rated lamp/load current (in Amps)
Z: Length of 26AWG wire (inches) from terminal trip to lamp

Illustrated Parts Breakdown

This section contains illustrated parts breakdowns specific to the A-dec 200 delivery system.

Part Identification

In this section, you will find serviceable components tables that correspond to the illustrations. The tables identify all parts and kits, including those that are not for sale. Parts that are not for sale are indicated with the symbol shown below:

†— Indicates that the individual part is not available for sale. These parts are typically part of a kit and/or larger assembly that is for sale.

Contents

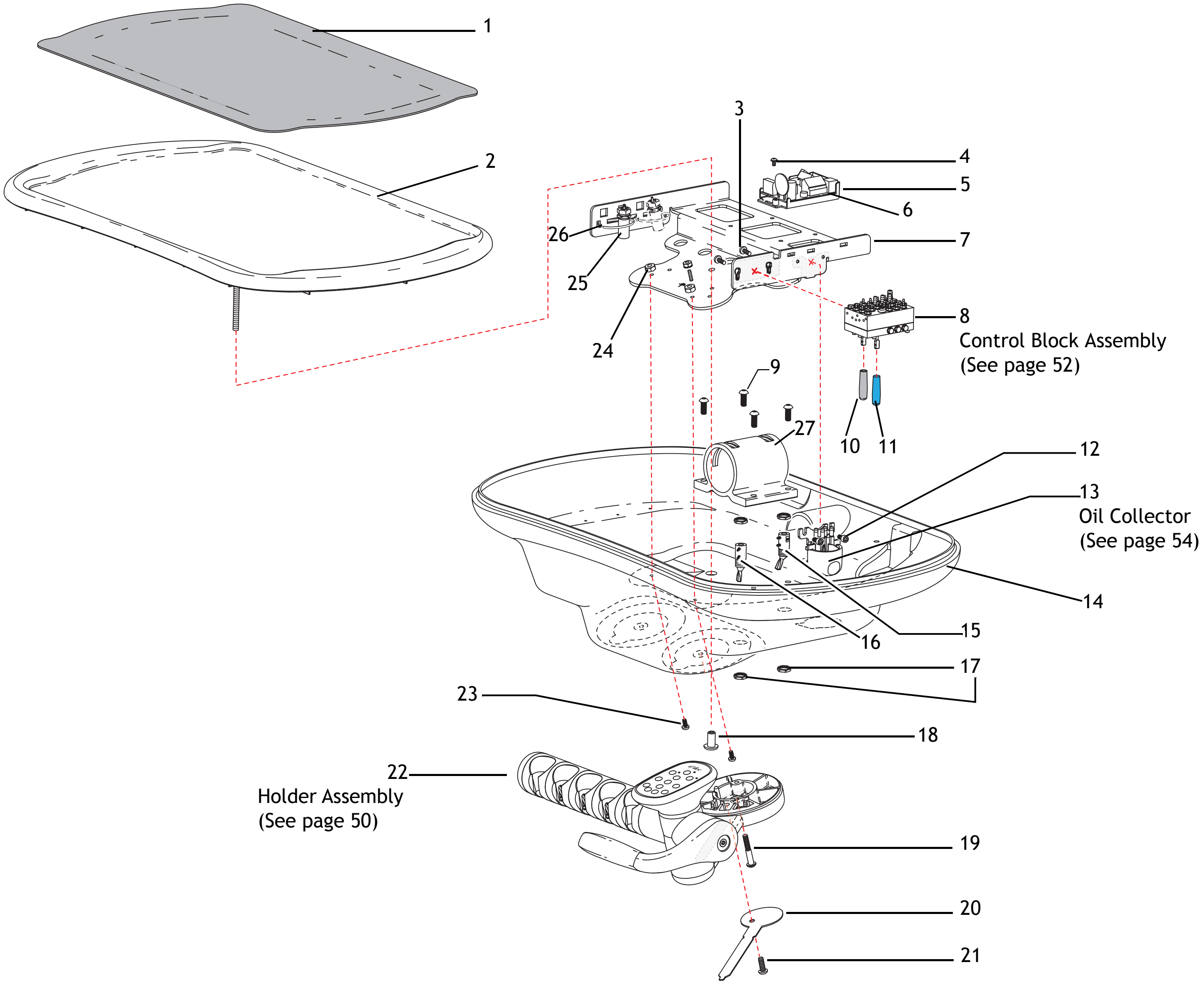
- A-dec 200 Delivery System, page 48
- Holder Assembly, page 50
- Control Block Assembly, page 52
- Toggles Assemblies (Flush Toggle and Master On/Off Toggle), page 53
- Oil Collector, page 54

A-dec 200 Delivery System

Item	Part Number	Description
1	39.2027.00	Pad
2	75.2275.00	Control housing top cover
3	002.140.00	Screw, button head socket, 10 - 32, stainless steel
4	001.073.00	Screw, 6-32 X 1/4" pan head SEMS Phillips
5	90.1168.00	QVIOLS
6	43.0133.00 †	PCB housing
7	75.2276.00	Control head chassis
8	38.1839.00	A-dec 200 control block assembly
9	005.002.00	Screw, 1/4-20 x 5/8, button head socket
10	027.057.00	Control block knob, light blue
11	027.057.01	Control block knob, gray
12	001.016.01	Screw, 10-32 X 3/8" Socket
13	77.0059.01	Oil collector, white 2
14	75.2256.00	Control housing bottom Cover
15	33.0173.00	Master on/off valve assembly, 3-way gray toggle, up-R
16	33.0009.03	Flush toggle valve assembly, 2-way gray MOM , up-L
17	006.009.00	Hex nut, 15/32-32 X 9/16" X 3/32
18	006.136.00	Nut, 1/4 - 20 x 17 mm, chrome
19	001.112.03	Screw, 1/4-20 X 1-1/2" Button Head Socket
20	77.1108.00	Cover, doctor's handpiece holders arm
21	005.012.03	Screw, 10-32 X 3/8" stainless steel socket head
22	—	Handle and Holders Assembly (see page 52)
23	005.002.00	Screw, 1/4-20 X 5/8" button head socket
24	006.016.00	Nut, hex, KEPS, 10-32 X 3/8 X 5/32
25	43.0187.00	Air electric switch assembly
26	025.036.01	Cable tie, package of 10
27	35.1763.00	Mount, Chassis, Control Head

† Indicates that the individual part is not available for sale

Figure 49. A-dec 200 Delivery System


1
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4
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7
26
25
24
8
Control Block Assembly
(See page 52)
9
27
10
11
12
13
Oil Collector
(See page 54)
14
15
16
17
23
18
22
Holder Assembly
(See page 50)
19
20
21

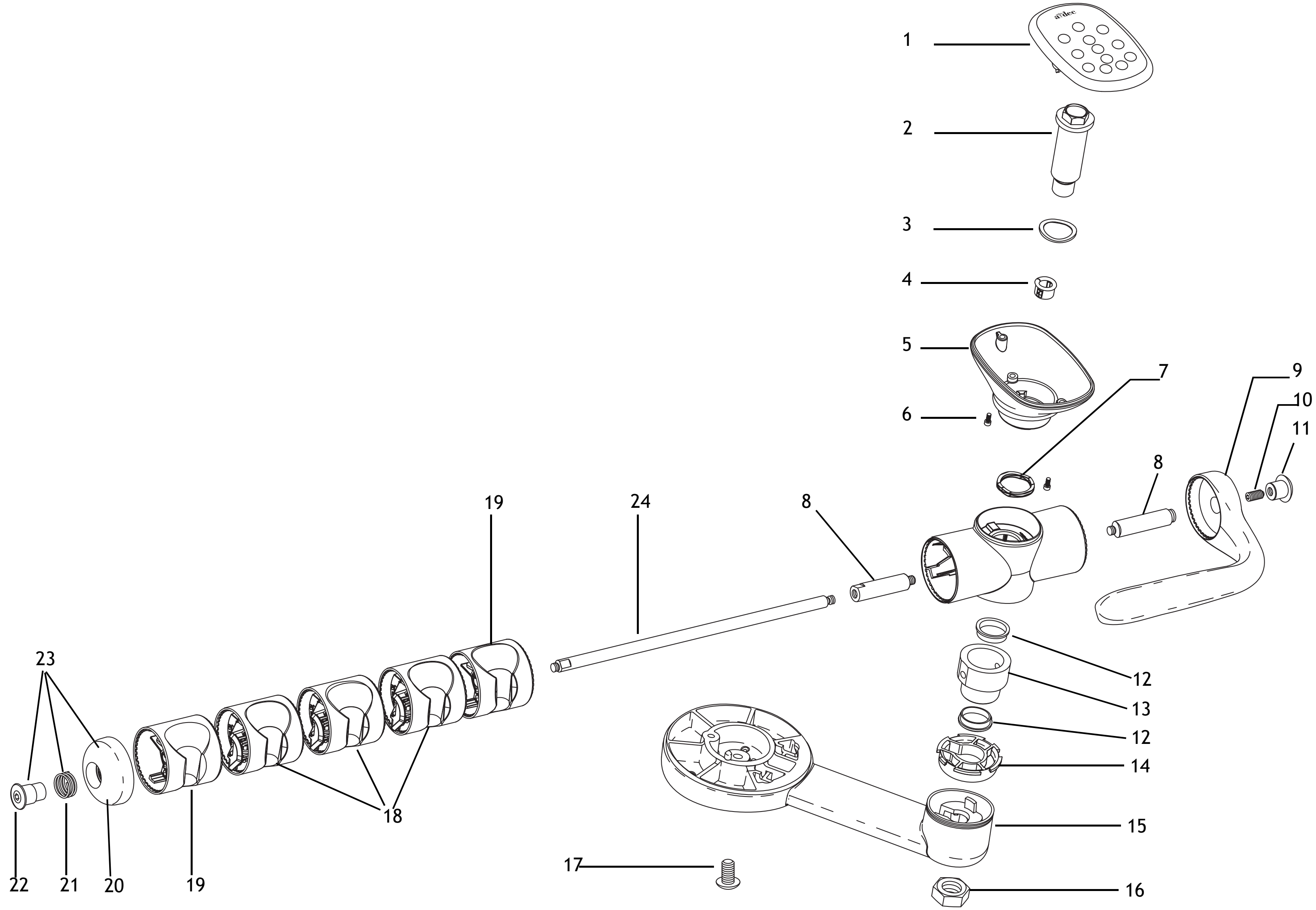
Holder Assembly

Item	Part Number	Description
1	90.1186.00	Standard Touchpad Cap/PCB Assembly, White 2
2	35.1758.00	Holder Turret Bolt, 2"
3	004.060.00	Washer, .875 X 1.125 X .020 Thick
4	041.663.00	Bushing
5	77.0335.01	Touchpad Base, White 2
6	003.078.00	Screw, 4-40 X 1/4" Socket Head
7	004.237.00	Wave Spring Washer, 1.125" OD
8	99.1137.00	Turret Base Axle
9	77.1088.00	Handle
10	007.060.00	Set Screw, 1/4-20 X 1/2" Flat Point
11	90.1216.00	Holder End Cap Nut
12	99.0698.00	Inner Hub Bearing
13	90.0713.00	Inner Hub
14	35.1759.00	Turret Stop Spacer
15	77.1107.01	Doctor’s Handpiece Holders Arm
16	006.121.00	Hex Jam Nut, 5/8 -18, Grade 5
17	001.112.03	Screw, 1/4-20 X 1-1/2" Button Head Socket
18	99.1142.00 †	Handpiece holder
19	99.1140.00 †	Saliva Ejector/Syringe Holder, 2" Diameter, No/V
20	99.0689.01 *	Cap
21	013.011.00	Spring
22	99.0692.00 *	Holder End Cap Nut
23	99.0710.01	End Cap Assembly
24	99.1138.00	Holder Axle

† Indicates that the individual part is not available for sale

* Available only with p/n 99.0710.01

Figure 50. Holder Assembly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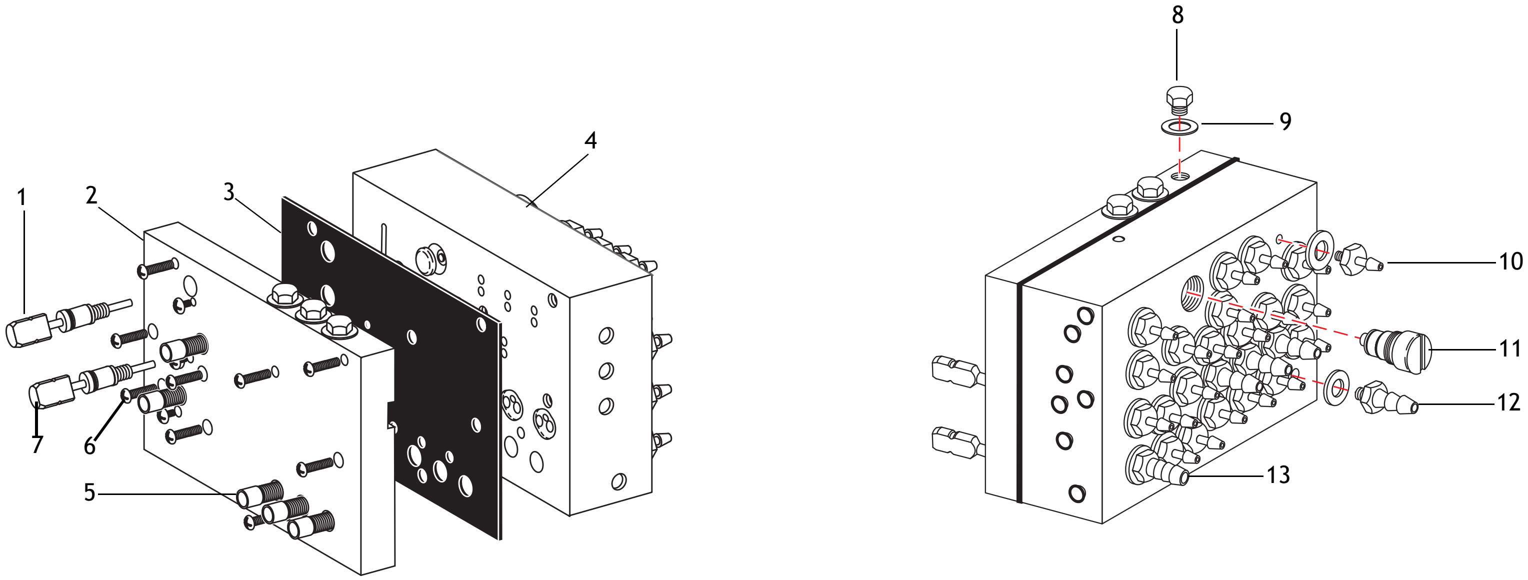
19

Control Block Assembly

Item	Part Number	Description	Item	Part Number	Description
1	38.0712.00	Water coolant stem (with O-ring)	7	38.0713.00	Air coolant stem (with O-ring)
2	38.0710.00 †	Block cap	8	021.016.01	Plug, package of 10
3	38.0711.01	Diaphragm, package of 5	9	004.005.02	Washer, package of 10
4	38.1839.00	Control block assembly (with barbs)	10	023.004.03	Barb, 1/8", package of 10
5	38.0766.02	Flow control screw, package of 5	11	38.1775.00	Performer (A-dec 200) block service kit
6	001.021.00	Screw	12	023.001.03	Barb, 1/4", package of 10
			13	023.805.01	Barb, 5/16", package of 10

† Indicates that the individual part is not available for sale

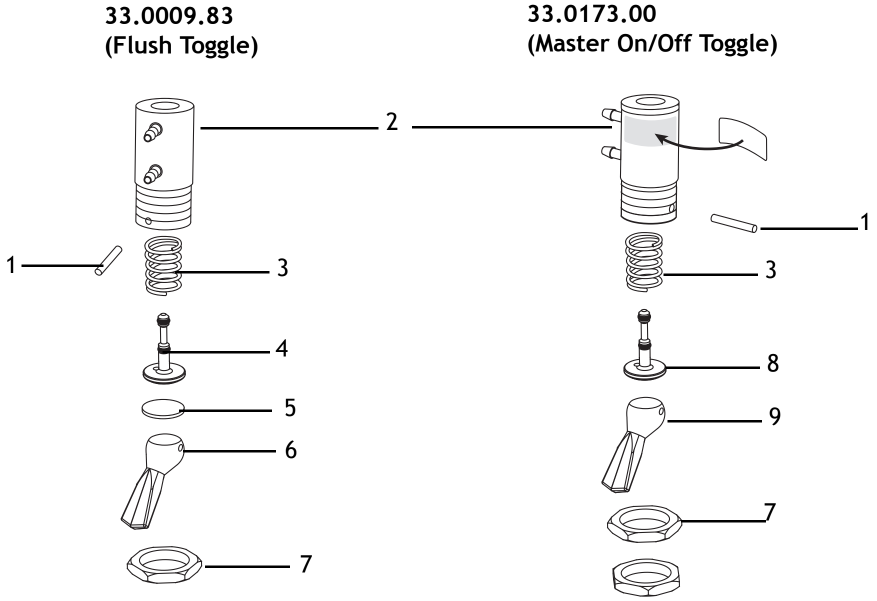
Figure 51. Control Block Assembly



Toggles Assemblies (Flush Toggle and Master On/Off Toggle)

Item	Part Number	Description
1	011.038.01	Pin, , package of 10
2	33.0050.00	Valve Body
3	22.0040.00	Spring
4	29.0830.00	Stem With O-rings, 2 Way
5	33.0007.00	Disk
6	33.0036.01	Toggle, Momentary, Gray
7	006.009.00	Hex Nut, 15-32 X 9/16 X 3/32
8	29.0840.00	Stem With O-rings, 3 Way
9	22.0462.03	Toggle, Gray 3

Figure 52. Flush Toggle and Master On/Off Toggle



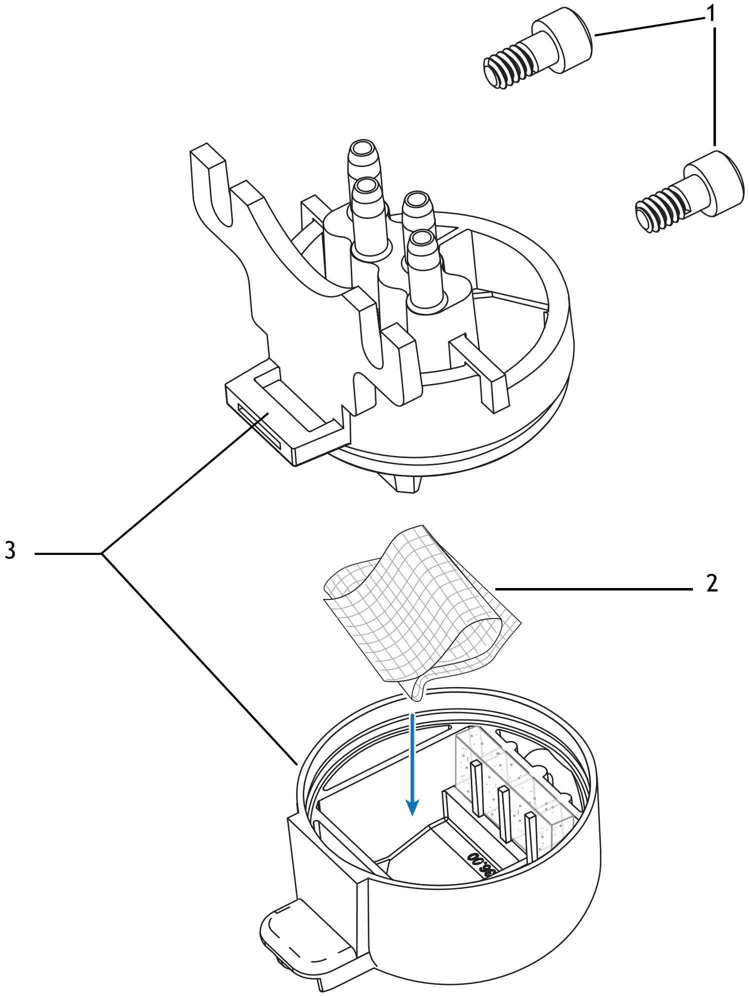
33.0009.83
(Flush Toggle)

33.0173.00
(Master On/Off Toggle)

Oil Collector

Item	Part Number	Description
1	001.016.01	Socket head screw, 10-32 X 3/8"
2	026.143.0	Gauze pad
3	77.0059.01	Oil collector assembly, white 2

Figure 53. Oil Collector



CUSPIDOR AND SUPPORT CENTER

This section provides detailed information related to service, maintenance, and adjustment of the A-dec 200 cuspidor and support center.

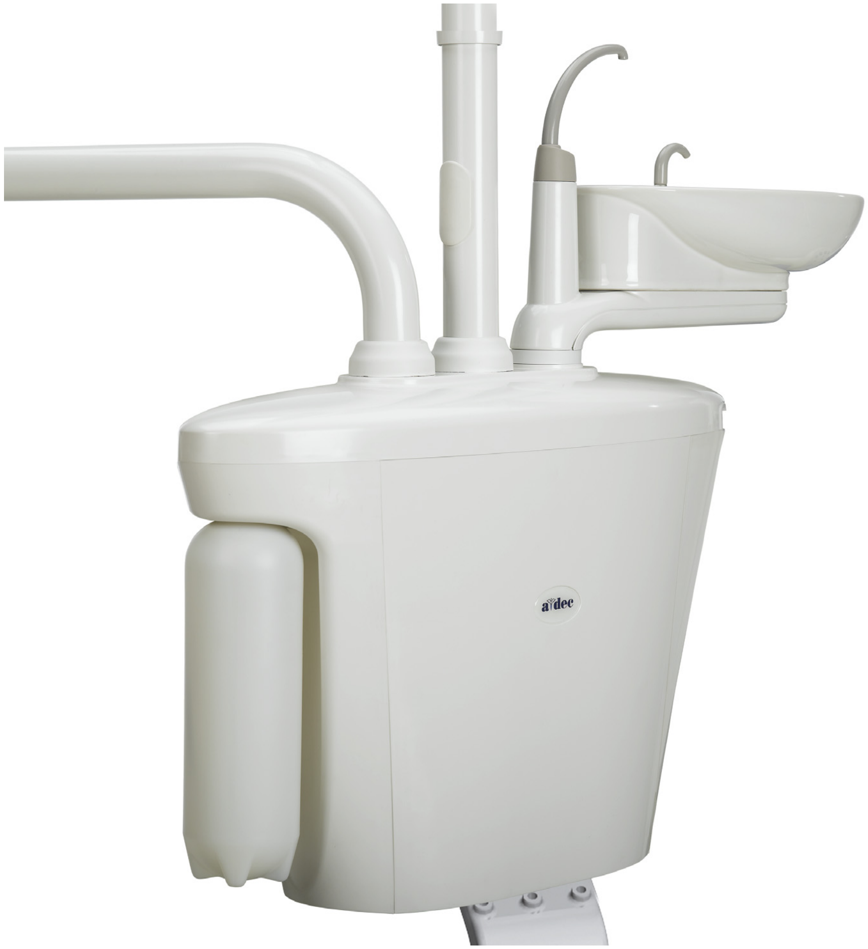
Contents

- Product Overview, page 55
- Service, Maintenance, and Adjustments, page 56
- Illustrated Parts Breakdown, page 57

Product Overview

A-dec 200 Support Center provides chair side mounting of the A-dec 200 Delivery System, Cuspidor, A-dec 200 Dental Light, and Assistant's Instrumentation. The support center mounts to the A-dec 200 chair using a post mount.

Figure 54. A-dec 200 Support Center with Cuspidor



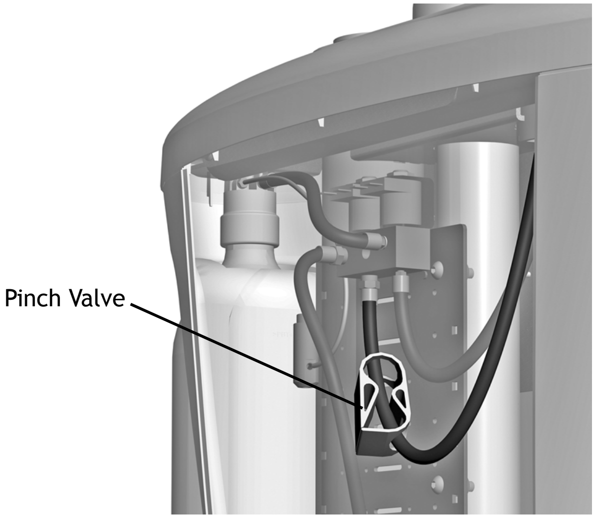
Service, Maintenance, and Adjustments

Bowl Rinse Flow Adjustment

Adjustments to the cuspidor bowl rinse flow are made inside the support center. To adjust the flow:

1. Loosen the two thumb screws at the bottom of the support center and carefully pull the cover out.
2. With the cuspidor bowl rinse on, tighten or loosen the pinch valve to adjust the flow.
3. For the best rinsing action, adjust the flow pattern by rotating the bowl rinse.

Figure 55. Pinch Valve Adjustment



Adjusting the Cuspidor Cupfill and Bowl Rinse

For adjustment information, see "Cuspidor Cupfill and Bowl Rinse" on page 34.

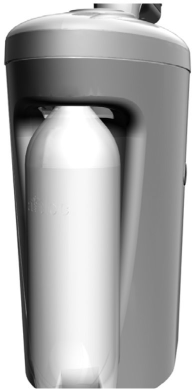
Self-Contained Water System

The self-contained water system provides water to the handpieces, syringes, and cuspidor cupfill. The system includes a 2 liter water bottle that mounts to the support center and offers a way to ensure the quality of treatment water. Turn the bottle counterclockwise to remove it.

⚠ **WARNING** Use only A-dec self-contained water bottles. Do not use any other bottles, including glass or plastic beverage bottles. Do not use damaged bottles. These can pose a serious safety hazard while pressurized. A-dec plastic water bottles cannot withstand heat sterilization. Attempting to do so will damage the bottle and your sterilizer.

⚠ **CAUTION** Use caution when using the self-contained water system with accessories that require and uninterrupted water supply (such as scalers) as these could get damaged without a continuous water source. Do not use saline solutions, mouth rinses, or any chemical solutions (not specified in this guide) in your A-dec self-contained water system. These may damage the system components and cause your dental unit to fail.

Figure 56. Self-Contained Water Bottle



Illustrated Parts Breakdown

This section contains illustrated parts breakdowns specific to the A-dec 200 Support Center and Cuspidor.

Part Identification

In this section, you will find serviceable components tables that correspond to the illustrations. The tables identify all parts and kits, including those that are not for sale. Parts that are not for sale are indicated with the symbol shown below:

†— Indicates that the individual part is not available for sale. These parts are typically part of a kit and/or larger assembly that is for sale.

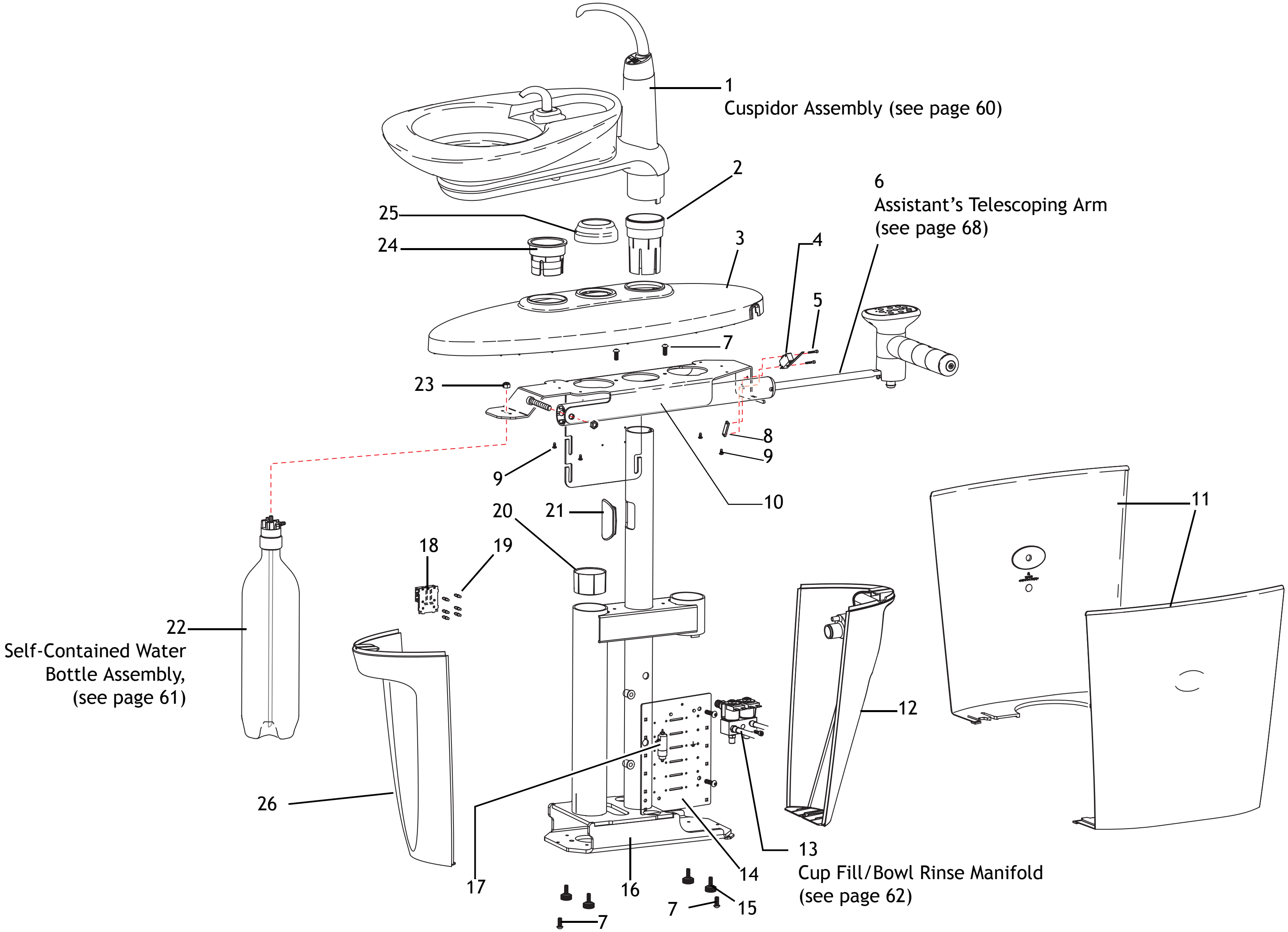
Contents

- A-dec 200 Support Center, page 58
- A-dec 200 Cuspidor, page 60
- Self-Contained Water Bottle, page 61
- Cupfill/Bowl Rinse Manifold, page 62

A-dec 200 Support Center

Item	Part Number	Description
1	—	Cuspidor assembly, (see page 60)
2	75.2271.00	Cuspidor bushing
3	75.2252.00	Top cover, white 2
4	044.184.00	Limit switch
5	001.218.00	Screw
6	—	Assistant’s telescoping arm assembly (see page 68)
7	005.002.00	Screw
8	60.0080.00	Mounting plate
9	003.112.00	Top cover mounting screws
10	75.2259.00	Top plate
11	75.2253.00	Side cover, white 2
12	75.2254.00	Front cover, white 2
13	38.1803.00	Cupfill/bowl rinse manifold (see page 62)
14	75.2270.00	Chassis
15	027.064.00	Thumbscrew
16	75.2258.00	Support chassis
17	24.0388.02	Regulator assembly, 40 PSI preset
18	90.1167.00	Data line PCB
19	90.1082.00	Stand off, package of 5
20	77.1086.00	Lower bushing
21	75.0150.00	Post plug
22	14.0486.00	Water bottle assembly (see page page 61)
23	006.052.00	Nut
24	77.1085.00	Upper bushing
25	77.1087.00	Trim ring
26	75.2255.00	Rear cover, white 2

Figure 57. A-dec 200 Support Center


1
Cuspidor Assembly (see page 60)
2
6
Assistant’s Telescoping Arm
(see page 68)
25
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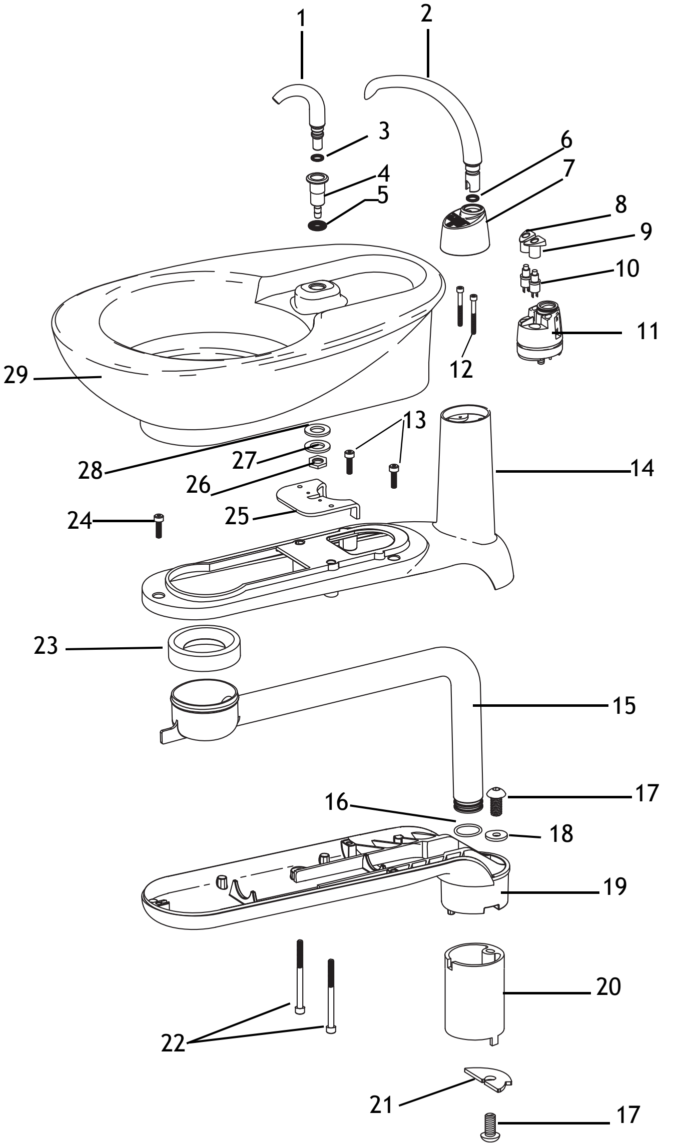
22
Self-Contained Water
Bottle Assembly,
(see page 61)
12
26
13
Cup Fill/Bowl Rinse Manifold
(see page 62)
17
16
14
7
15
7

A-dec 200 Cuspidor

Item	Part Number	Description
1	77.0042.01	Spout, bowl rinse, back mount
2	77.1112.00	Spout, cupfill, cuspidor
3	030.011.02	O-ring, AS568-011, .301 ID x .070 W, package of 10
4	77.0105.00	Socket, bowl rinse spout
5	030.014.02	O-ring, AS568-014, .489 ID x .070 W, package of 10
6	030.012.02	O-ring, AS568-012, .364 ID x .070 W, package of 10
7	77.0044.01	Gasket, spout, cup cuspidor
8	77.0099.00	Button, cuspidor fill/rinse, left
9	77.0100.00	Button, cuspidor fill/rinse, right
10	43.0010.00	Switch assembly, 20"
11	77.0097.01	Support, cuspidor mount with barbs
12	005.088.00	Screw, socket head, 6-32 x 1-1/4
13	001.088.00	Screw, socket head, 10-32 x 5/8 Stainless Steel
14	77.0108.01	Top housing, cuspidor, back mount
15	77.0040.00	Tube, drain, cuspidor, back mount
16	035.053.01	O-ring, vacuum, 20 mm x 2 mm, package of 10
17	002.058.00	Screw, button head socket, 3/8-16 x 3/4
18	004.141.00	Washer, flat, STL, .261 ID
19	77.0109.01	Bottom housing, cuspidor, back mount
20	75.2273.00	Hub, cuspidor
21	75.2274.00	Cuspidor stop
22	005.106.00	Screw, 10-32 x 2 1/2, socket head
23	12.0991.00	Drain seal
24	001.088.00	Screw, socket head, 10x32 x 5/8 stainless steel
25	77.0236.00	Bracket, hold down, cuspidor
26	006.009.00	Nut, hex, 15/32-32 x 9/16 x 3/32
27	004.132.00	Washer, flat, stainless steel, .500 ID
28	004.035.00	Washer, flat, nylatron, .511 ID
29	77.0038.01	Bowl, cuspidor, ceramic

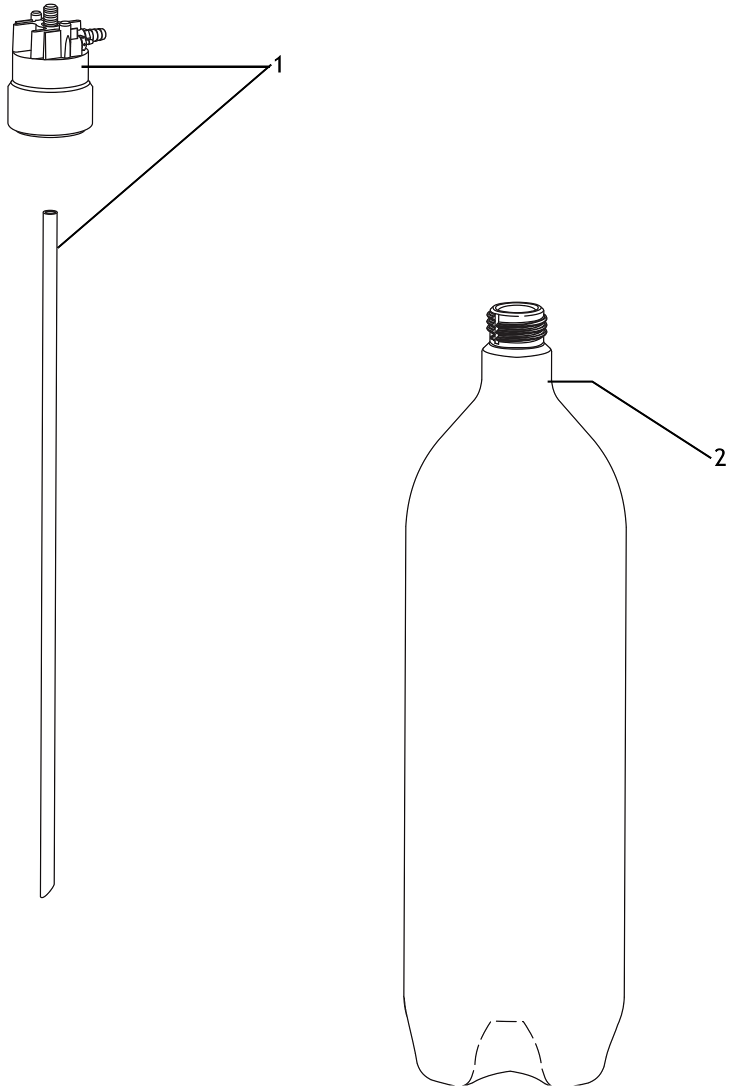
Figure 58. Cuspidor



Self-Contained Water Bottle

Item	Part Number	Description
1	14.0487.00	200 self-contained cap assembly
2	14.0486.00	Water bottle

Figure 59. Self-Contained Water Bottle

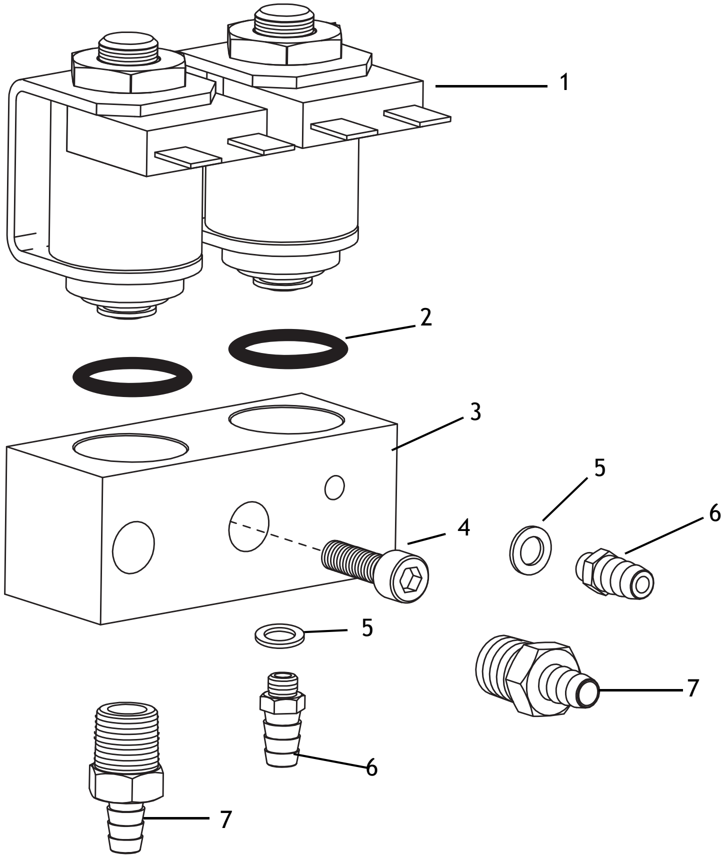


Cupfill/Bowl Rinse Manifold

Item	Part Number	Description
1	041.660.00	Solenoid, 24 vac assembly
2	030.016.02	O-ring, package of 10
3	77.0816.00 †	Manifold
4	001.088.00	Socket head screw, 1/4 - 20 x 5/8, stainless steel
5	004.005.02	Washer, package of 10
6	023.805.01	Barb, 5/16 x 10 - 32, package of 10
7	023.804.00	Barb, 5/16 x 1/8 NPT

† Indicates that the individual part is not available for sale

Figure 60. Cupfill/Bowl Rinse Manifold



ASSISTANT'S INSTRUMENTATION

This section provides detailed information related to service, maintenance, and adjustment of the A-dec assistant's instrumentation.

Contents

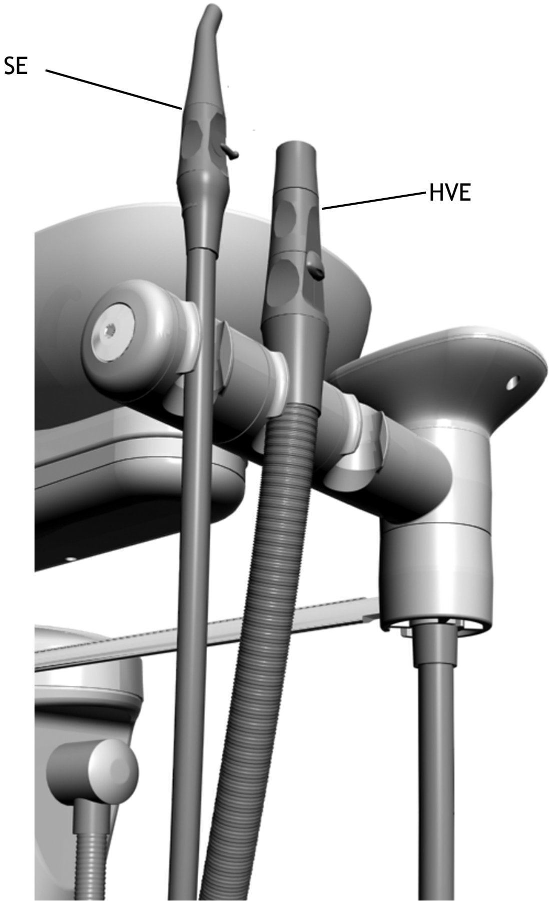
- Product Overview, page 63
- Service, Maintenance, and Adjustments, page 64
- Illustrated Parts Breakdown, page 67

Product Overview

The A-dec 200 assistant's instrumentation is equipped with an autoclavable syringe, high volume evacuator (HVE), and saliva ejector (SE). Some configurations may include an optional dual HVE or instrumentation that supports a chair-side or single-operatory vacuum system. Integrated into the support center is the solids collector, which connects with the HVE and SE to separate solids from the evacuated material.

The assistant's vacuum instruments disconnect from the tubing for easy cleaning, and they are fully autoclavable.

Figure 61. Assistant's Instrumentation



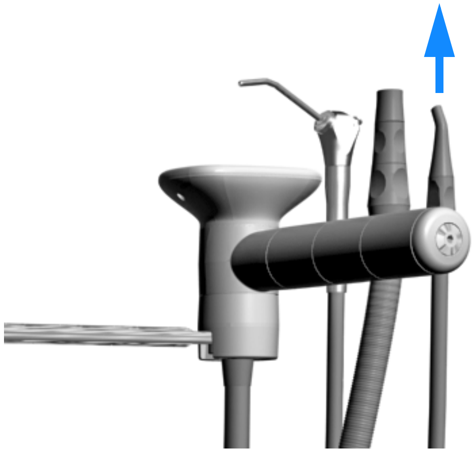
Service, Maintenance, and Adjustments

Auto-air Holder

Each handpiece in the holder assembly automatically activates when you lift it from its holder.

Holders provide vacuum On/Off switching for users whose vacuum system requires this functionality. The vacuum pump activates automatically when you lift the HVE or SE from the holder. The vacuum turns off when you place the HVE or SE back into the holder.

Figure 62. Auto-Air Holder



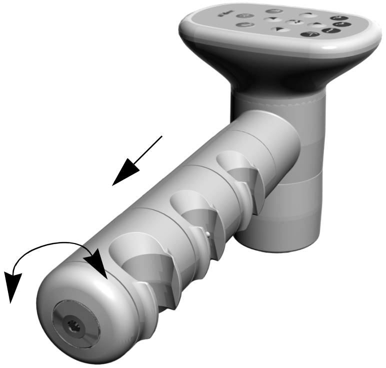
Positioning Assistant’s Holder

The independently adjustable holders rotate to allow customized positioning for each instrument on the assembly.

To rotate holder:

1. Pull holder slightly away from the adjacent one.
2. Rotate to the desired position and release.

Figure 63. Rotating Instrument Holders

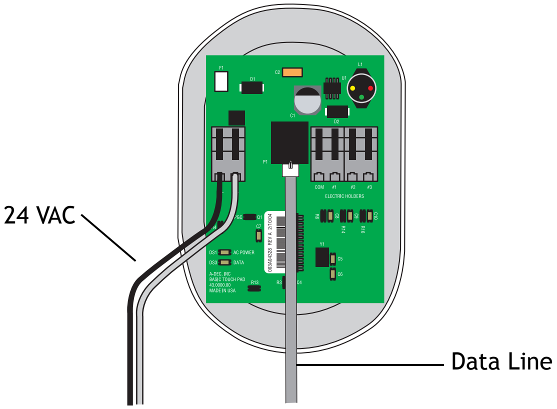


NOTE Auto-air holders rotate together. Standard holders rotate individually

Assistant’s Touchpad Connections

The assistant’s instrumentation uses a standard touchpad that serves as a single touch surface for controlling the chair, dental light, and cuspidor. The touchpad can rotate 340° for access and visibility.

Figure 64. Assistant’s Touchpad with Standard Holder Connections

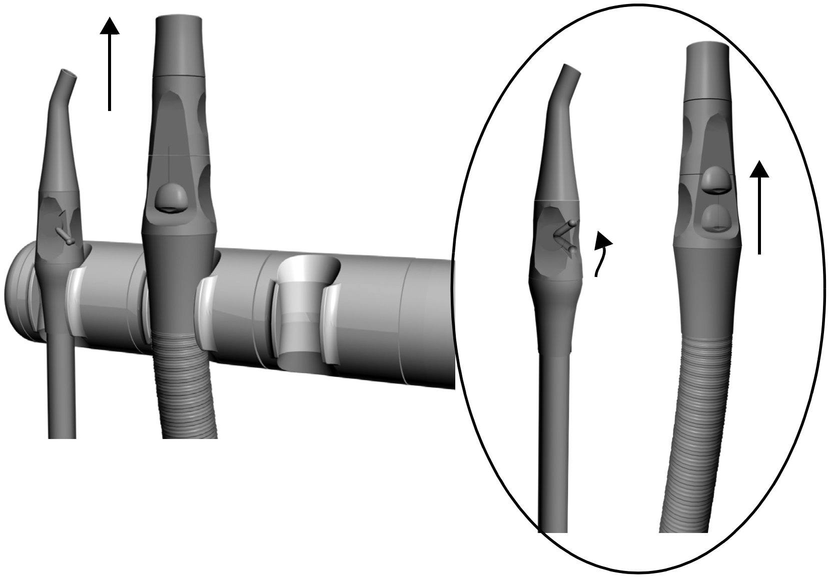


Vacuum Instrumentation

To use the HVE and SE, lift the holder from the valve to activate the vacuum.

NOTE Lifting the handpiece from the holder only activates the vacuum with auto-air switches.

Figure 65. HVE and SE Operation



Solids Collector

The solids collector aids in preventing solids from entering the central vacuum system.

CAUTION Use appropriate gloves when handling contaminated parts.

Replace Solids Collector Screen

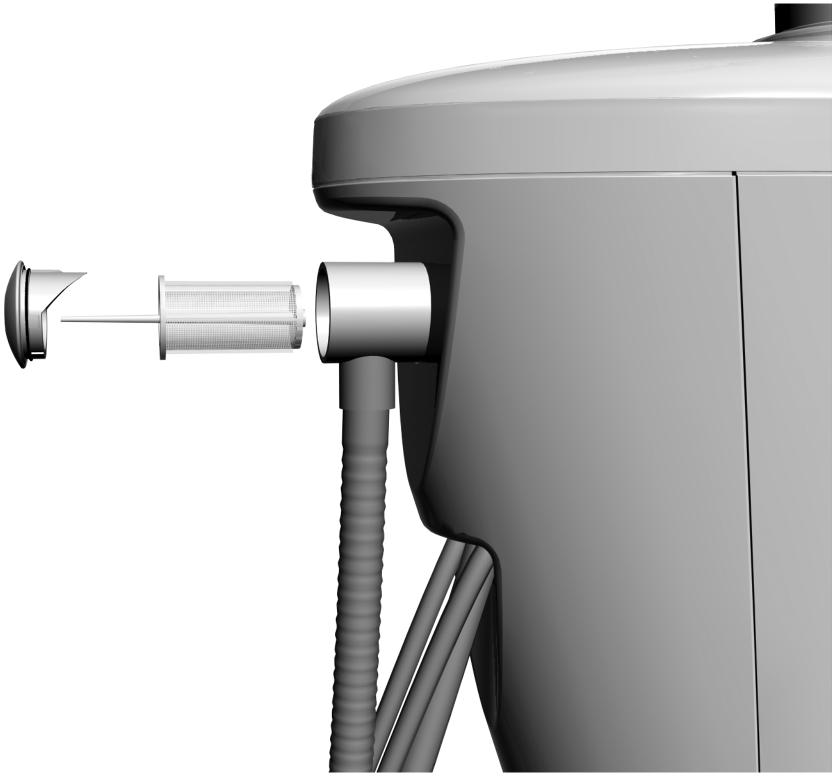
1. Turn off vacuum or open the HVE control valve.
2. Remove the solids collector cap.
3. Remove the solids collector screen.
4. Discard the screen according to your local regulations.

CAUTION Do not empty the screen into the cuspidor. Doing so could plug the drain.

5. Insert the new screen in the collector and replace the cap.

CAUTION Ensure that the solids collector cap is inserted properly. Failure to do so will not allow for proper suction.

Figure 66. Replace Solids Collector Screen



Illustrated Parts Breakdown

This section contains illustrated parts breakdowns specific to the A-dec 200 Support Center and Cuspidor.

Part Identification

In this section, you will find serviceable components tables that correspond to the illustrations. The tables identify all parts and kits, including those that are not for sale. Parts that are not for sale are indicated with the symbol shown below:

†— Indicates that the individual part is not available for sale. These parts are typically part of a kit and/or larger assembly that is for sale.

Contents

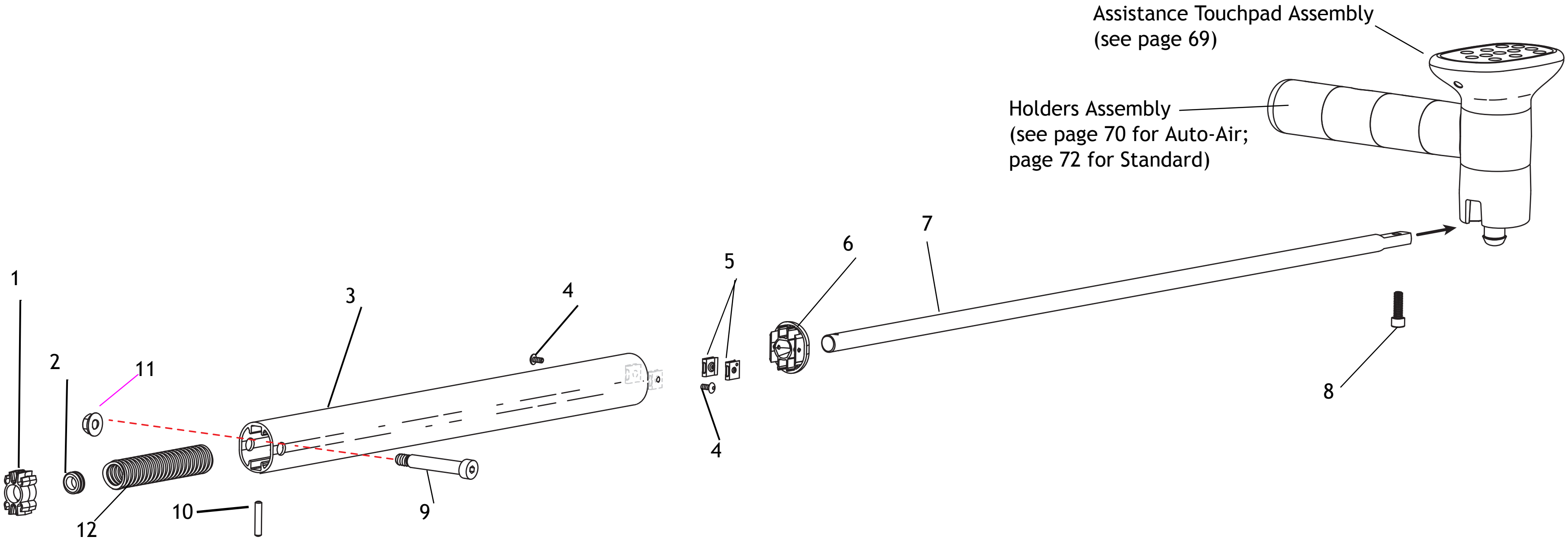
- Telescoping Assistant’s Arm, page 68
- Assistant’s Touchpad Assembly, page 69
- Assistant’s Auto-Air Holder, page 70
- Assistant’s Standard Holder, page 72

Telescoping Assistant's Arm

Item	Part Number	Description	Item	Part Number	Description
1	75.0018.00	Assistant's arm slide	7	77.1082.00	Assistant's arm rod
2	018.005.00	Grommet, 1/4 ID x .38 groove	8	002.080.01	Socket head screw, 1/4-20 x 3/4
3	77.1081.00	Telescoping arm housing	9	001.134.00	Socket shoulder screw, 5/16-18 x 3/8 x 2
4	001.167.00	Button head socket screw, 6-32 x 3/8, stainless steel	10	011.099.00	Pin dowel, .187 dia x 1.00 lg
5	006.040.00	Retainer nut, 6-32	11	006.132.00 †	Nut, lock, 5/16-18 x 1/2 x .275
6	75.0019.01	End cap	12	024.152.01	Convolute tubing, 5/8 ID - 4" long

† Indicates that the individual part is not available for sale

Figure 67. Telescoping Assistant's Arm



Assistance Touchpad Assembly (see page 69)
Holders Assembly (see page 70 for Auto-Air; page 72 for Standard)
1
2
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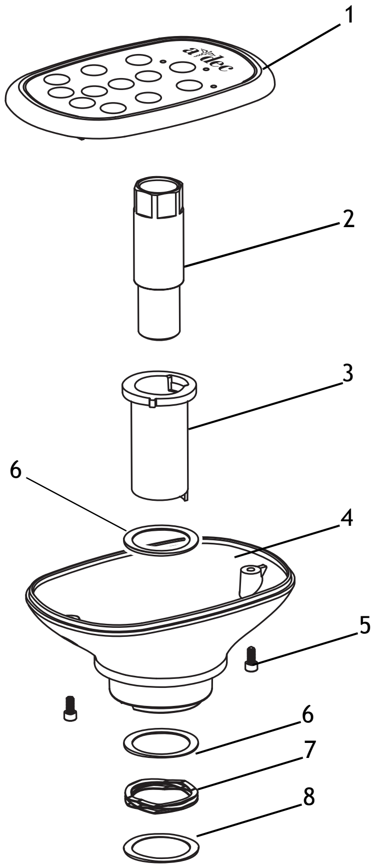
9

Assistant's Touchpad Assembly

Item	Part Number	Description
1	90.1186.00	Touchpad cap
2	77.0123.00	Pass-through bolt
3	99.0651.00	Spline
4	77.0335.01	Touchpad base
5	003.078.00	Socket head screw, 4-40 X 1/4
6	004.173.00	Washer
7	004.237.00	Wave spring washer
8	004.060.00	Washer

Figure 68. Assistant's Touchpad Assembly

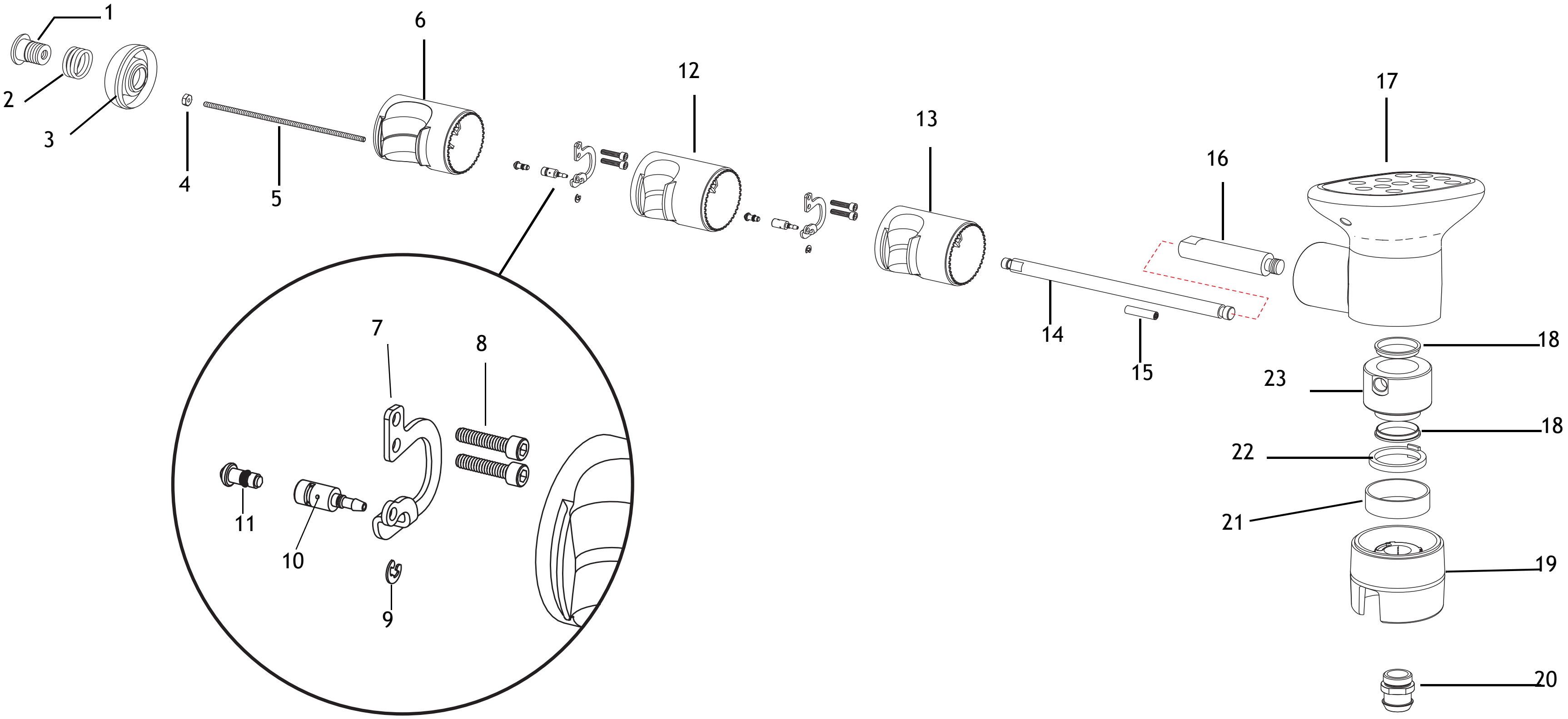


Assistant’s Auto-Air Holder

Item	Part Number	Description	Item	Part Number	Description
1	— *	Nut	13	99.1142.00 †	SE/Syringe Holder
2	013.011.00	Spring	14	83.0624.00 †	Axle
3	90.1216.00	End-Cap Assembly	15	83.0585.00 †	Special Nut, 4-40 X .75
4	006.011.00	Nut, 4-40 X 1/4 X 3/32	16	83.0648.00	Holder Base Axle
5	83.0573.00 †	Holder Rod †	17	—	Touchpad Assembly
6	99.1141.00 †	15 mm HVE Holder †	18	99.0698.00	Bearing
7	83.0583.00 †	Sensor Spring †	19	77.0956.01	Turret Adaptor
8	001.021.00	Socket Head Screw, 4-40 X 1/2 Stainless Steel	20	023.822.00	5/8" Barb
9	010.019.00	E-ring, .904 ID	21	99.0687.00	Sleeve
10	83.0582.00 †	Sensor Spool	22	77.0385.00	Stop
11	83.0581.00 †	Sensor Button	23	83.0647.00 †	Inner Hub
12	99.1143.00 †	Auto-Air Holder			

† Indicates that the individual part is not available for sale
* Part of Item 3, p/n 90.1216.00

Figure 69. Auto-Air Assistant's Holders Assembly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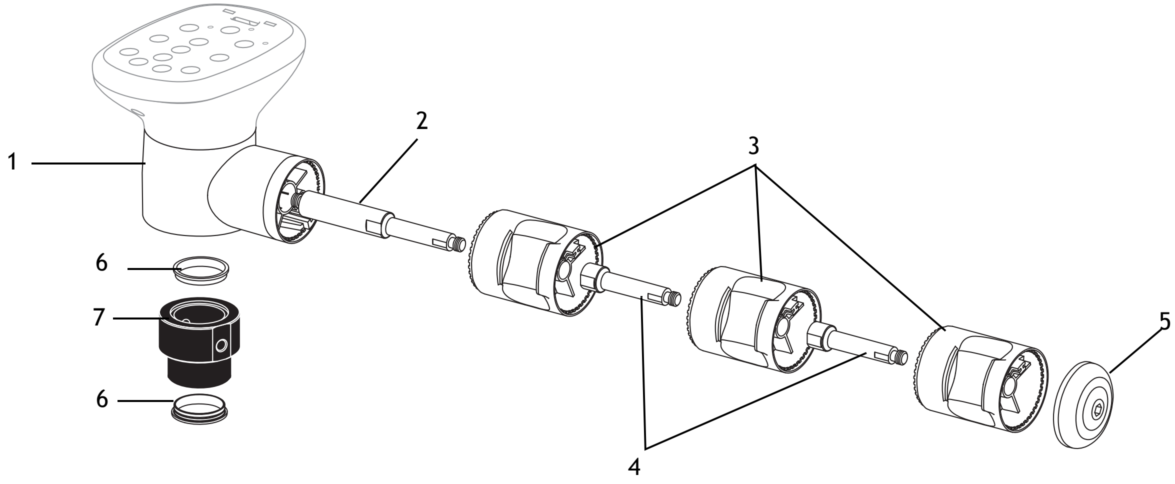
11
10
9

Assistant's Standard Holder

Item	Part Numbers	Description
1	99.0649.01 †	Turret
2	99.0701.00	Turret axle, assistant's arm
3	99.0653.03 99.0650.03 99.0652.03	Holder, SE/Syringe kit, White 2, 9 mm Holder, standard HVE kit, White 2, 11 mm Holder, assistant's HVE kit, White 2, 15 mm
4	99.0660.00 †	Axle
5	99.3684.00	End cap assembly kit
6	99.0698.00	Bearing
7	99.0699.00	Inner hub assistant's arm

† Indicates that the individual part is not available for sale

Figure 70. Assistant's Standard Holder Components



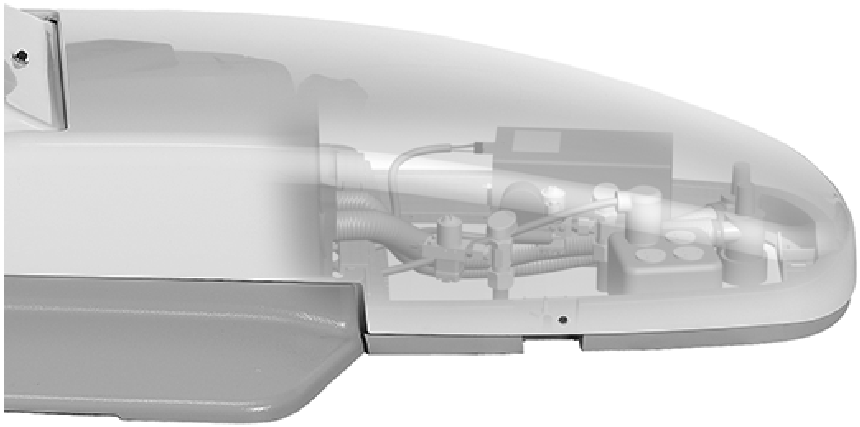
UTILITIES

This section provides detailed information related to service, maintenance, and adjustment of the A-dec 200 utility area.

Contents

- Product Overview, page 74
- Service, Maintenance, and Adjustments, page 75
- Illustrated Parts Breakdown, page 77

Figure 71. Utilities on A-dec 200 Dental Chair



Product Overview

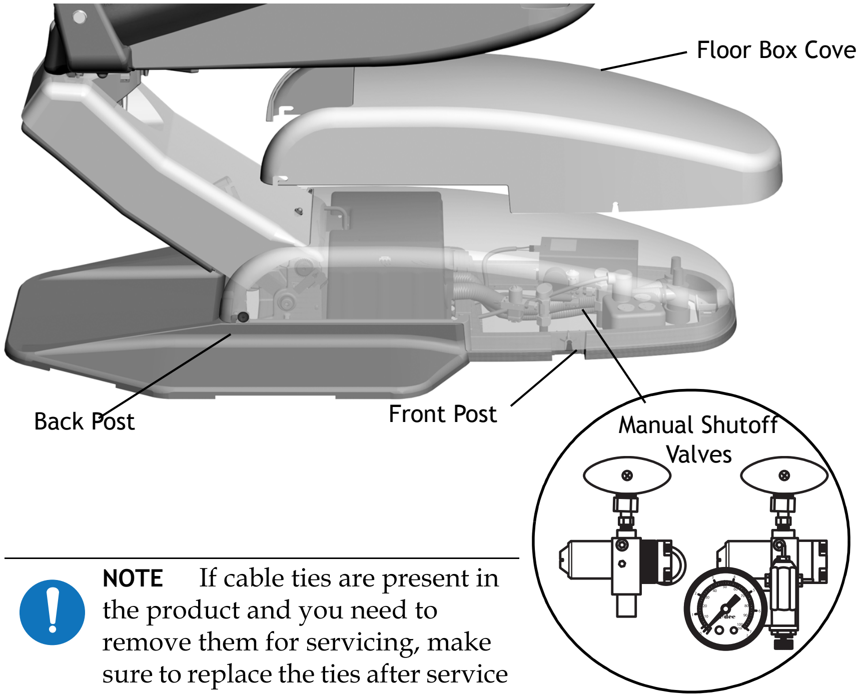
The utilities for your system are located under the chair floor box. To access the utilities, pull the floor box cover up at the front posts, and then forward and up to slide the cover off the back posts.

Shutoff Valves

Manual shutoff valves control the air and water to the system. To prevent leaks, these valves should remain fully open (turned counterclockwise) except while servicing the system.

Air and water pass through separate filters before entering the regulators. Replace these filters when they become clogged and cause restricted flow.

Figure 72. Floorbox Cover Removal and Shutoff Valves



NOTE If cable ties are present in the product and you need to remove them for servicing, make sure to replace the ties after service is completed.

Gauge and Pre-Regulator

The pre-regulator controls the air and water pressure in the unit. The gauge displays the unit air pressure.

Figure 73. Utilities Diagram

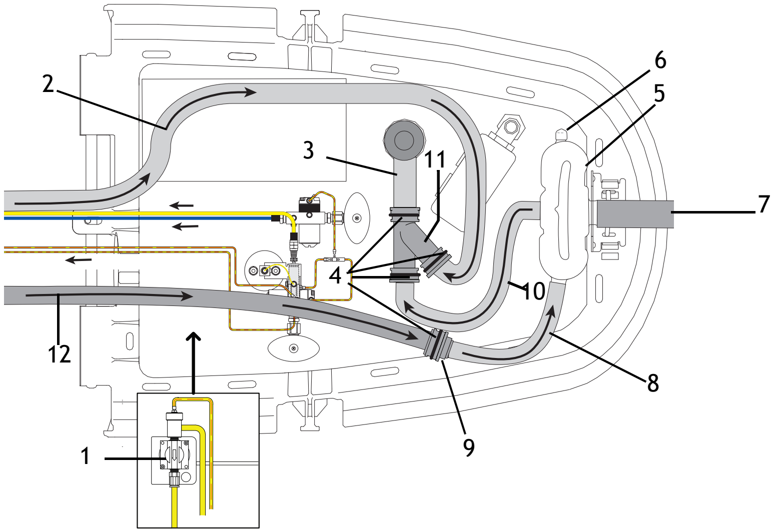


Table 9. Utilities Descriptions

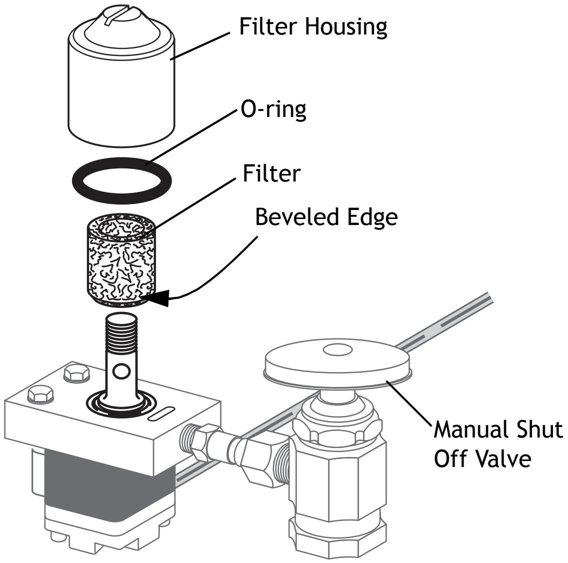
Item	Description	Item	Description
1	Moisture separator (optional)	7	Air exhaust
2	Cuspidor drain tube	8	5/8" exhaust tube
3	20 mm tube to drain	9	Durr adapter
4	Connector clips (four)	10	20 mm tube to liquid separator drain
5	Liquid separator tank	11	Y connector
6	Cap	12	Exhaust tube

Service, Maintenance, and Adjustments

Air and Water Filter Replacement

Air and water pass through separate filters before entering the regulators. Replace a filter when it becomes clogged and causes restricted flow.

Figure 74. Air and Water the Filter Components


Filter Housing
O-ring
Filter
Beveled Edge
Manual Shut Off Valve

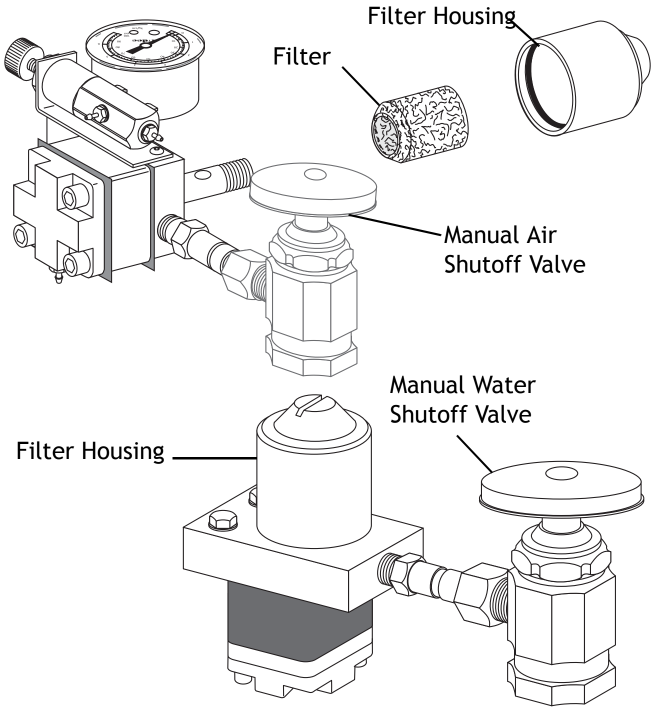
To replace the Filter:

1. Turn off the master toggle and close the manual shutoff valves (turn clockwise).
2. Bleed the system of air and water pressure by operating the syringe buttons until air and water no longer flow.
3. Using a standard screwdriver, remove the filter housing from the air or water filter pre-regulator assembly and remove the filter.
4. Replace the filter if it is clogged or discolored. Install the filter with the beveled edge facing the manifold.

CAUTION To ensure proper delivery system operation, install the filter with the beveled edge facing the manifold.

NOTE Turn the pre-regulator knob clockwise to increase pressure and counterclockwise to decrease pressure. Read the pressure gauge while adjusting. Water pressure will increase/decrease by half of the gauge indication.

Figure 75. Replacing Filters


Filter Housing
Filter
Manual Air Shutoff Valve
Manual Water Shutoff Valve
Filter Housing

Illustrated Parts Breakdown

This section contains illustrated parts breakdowns specific to the A-dec 200 utilities.

Part Identification

In this section, you will find serviceable components tables that correspond to the illustrations. The tables identify all parts and kits, including those that are not for sale. Parts that are not for sale are indicated with the symbol shown below:

†— Indicates that the individual part is not available for sale. These parts are typically part of a kit and/or larger assembly that is for sale.

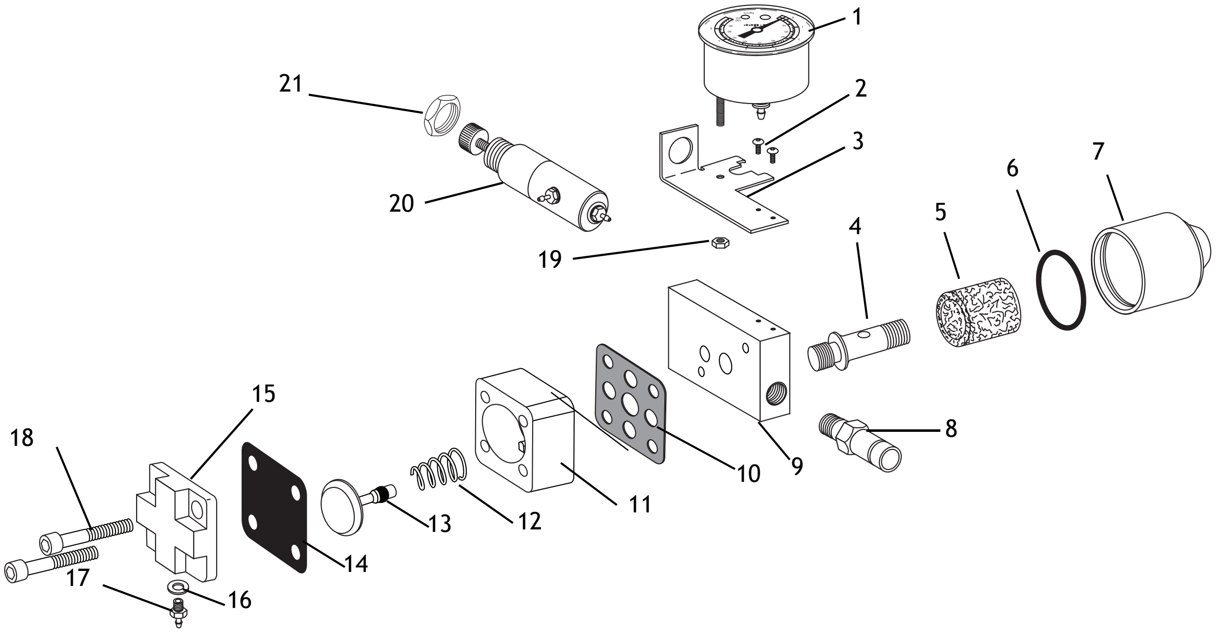
Contents

- Air Filter/Regulator Assembly, page 78
- Water Filter/Regulator Body Assembly, page 79

Air Filter/Regulator Assembly

Item	Part Number	Description	Item	Part Number	Description
1	026.154.00	Gauge	11	24.0135.00	Regulator, body, white
2	001.024.00	Screw	12	22.0460.00	Spring
3	24.0365.00	Bracket	13	24.0132.00	Piston with O-ring
4	24.0232.00	Stud, filter/regulator manifold	14	22.0440.02	Diaphragm, package of 10
5	24.0234.01	Filter, package of 6	15	24.0368.00	Valve cover
6	030.019.03	O-ring, package of 10	16	004.005.02	Washer, flat nylon, 187 ID
7	24.0229.00	Filter housing	17	023.004.01	Barb, 1/8 x 10-32
8	021.042.00	Adaptor	18	001.026.00	Screw, socket head, 6-32 x 7/8"
9	24.0162.00	Manifold, filter/regulator	19	006.015.00	Nut, hex, 6-32 x 5/16 x 9/64"
10	24.0137.01	Gasket, 9-hole	20	24.0182.81	Regulator, air assembly
			21	006.009.00	Nut, hex, 15/32 - 32 x 9/16 x 3/32"

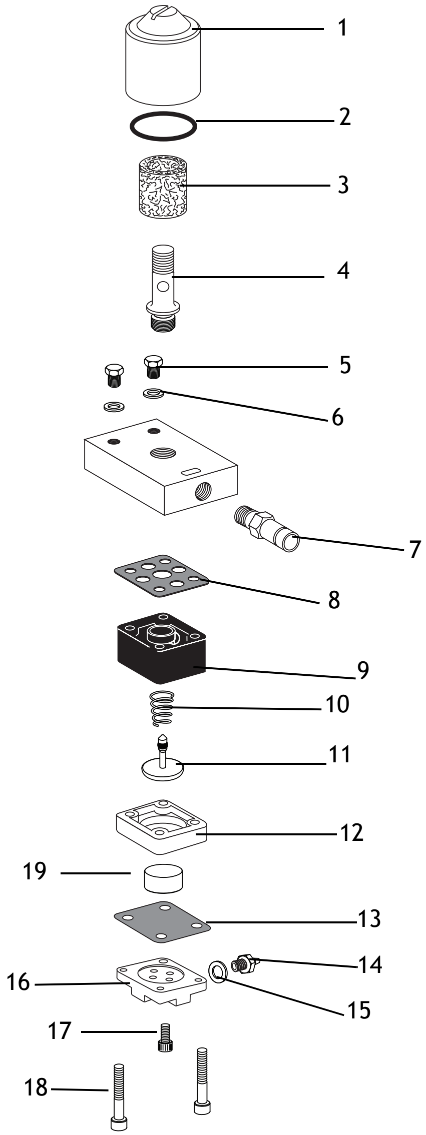
Figure 76. Air and Water Filter/Regulators Body Assembly Components



Water Filter/Regulator Body Assembly

Item	Part Number	Description
1	24.0229.00	Housing, filter
2	030.019.03	O-ring, package of 3
3	24.0234.02	Filter kit, package of 2
4	24.0232.00	Stud, filter/regulator manifold
5	021.016.04	Plug, hex head, 10 - 32
6	004.005.02	Washer
7	021.042.00	Adapter, 1/8" MPT to 3/8"
8	24.0137.01	9-hole gasket
9	24.0355.00	Body, black
10	013.032.00	Spring
11	24.0132.00	Piston with o-ring
12	24.0140.00	Spacer, water regulator
13	22.0440.02	Diaphragm, package of 10
14	023.004.01	Barb, 1/8" x 10-32
15	004.005.01	Washer, flat nylon 187 ID
16	24.0368.00	Valve cover
17	001.021.00	Screw, socket head, 4-40 x 1/2", stainless steel
18	001.024.00	Screw, socket head, 4-40 x 3/8", stainless steel
19	24.0142.00	Plunger

Figure 77. Air and Water Filter/Regulators Body Assembly Components



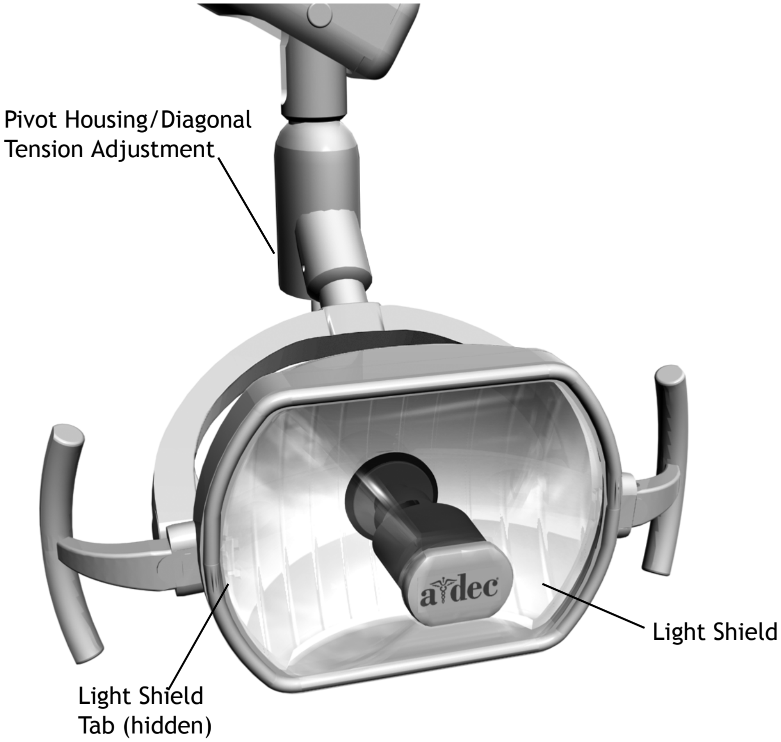
DENTAL LIGHT

This section provides detailed information related to service, maintenance, and adjustment of the A-dec 200 Dental Light.

Contents

- Product Overview, page 82
- Service, Maintenance, and Adjustments, page 83
- Illustrated Parts Breakdown, page 89

Figure 78. A-dec 200 Dental Light


Pivot Housing/Diagonal Tension Adjustment
Light Shield
Light Shield Tab (hidden)
a-dec

Product Overview

The dental light provides three intensities at the light head and the optional touchpad.

Dental Light Specifications

- Electrical (Transformer Output): 12.1/16/17 VAC
- Bulb: Quartz Xenon Halogen, single-end prongs, extended life
- Rating: 17V/95 watts
- Color temperature: 4800 Kelvin
- Heat output: 325 BTU/Hour
- Light Pattern: 3.9" x 6.7" at 27.6" (100 mm x 170mm at 700 mm)

Nominal Light Intensity

- Composite: 4400 lux (743 fc)
- High: 17,000 lux (2230 fc)

On/Off Button

The dental light can be operated from the assistant's or doctor touchpad. To turn the light on, off, or change intensity, press the dental light button on the touchpad.

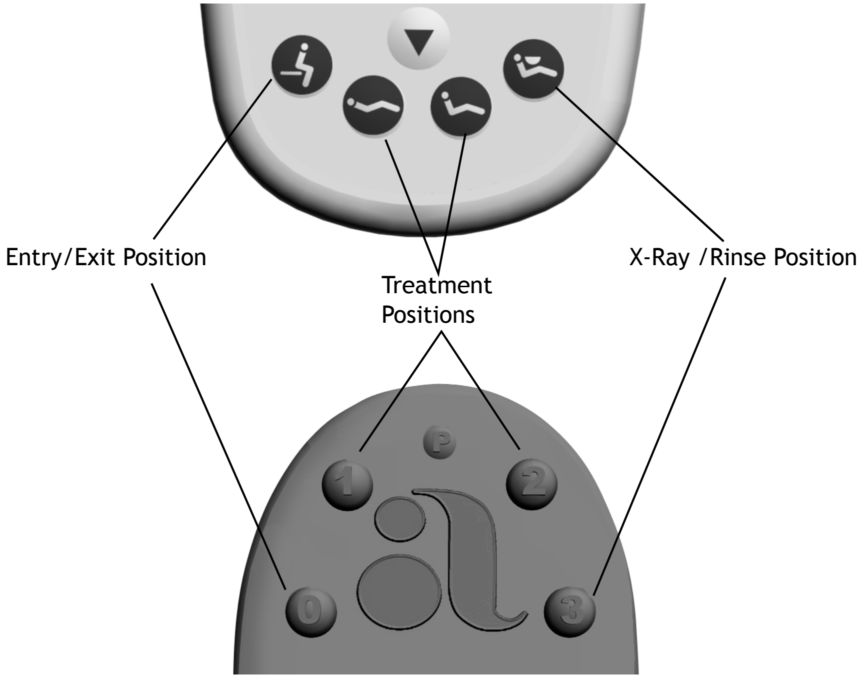
Auto On/Off Feature

The optional auto on/off feature turns the light on when the chair back reaches a treatment position. Press or , and the dental light turns off

To disable the auto. Press any button that moves the chair into an operating position. The dental light turns on when the chair reaches that position.

To activate/deactivate the auto on/off feature, press and hold the program and dental light buttons simultaneously for three seconds. One beep confirms the auto on/off is off. Three beeps confirm the auto on/off is on.

Figure 79. Touchpad and Footswitch Light Features



Service, Maintenance, and Adjustments

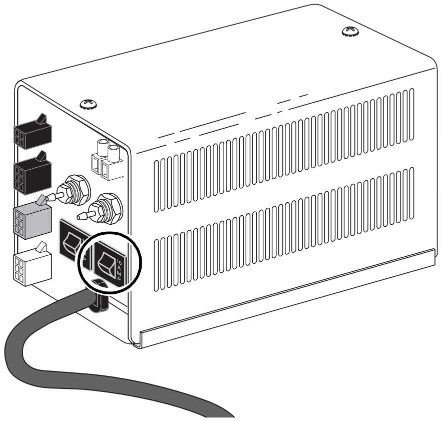
Contents

- Dental Light Wire Connections on the 200 Dental Chair, page 84
- Intensity Switches, page 83
- Dental Light Wire Connections on the 200 Dental Chair, page 84
- Dental Light Relay Circuit Board, page 86
- Bulb Replacement, page 88
- Rotation Adjustments, page 87
- Bulb Replacement, page 88

Circuit Breaker Location

A circuit breaker will interrupt the flow of electricity under abnormal conditions. If the circuit breaker should trip, inspect the wiring to ensure there are no shorts, and reset by pushing the circuit breaker. The circuit breaker for the dental light is located on the power supply.

Figure 80. Circuit Breaker

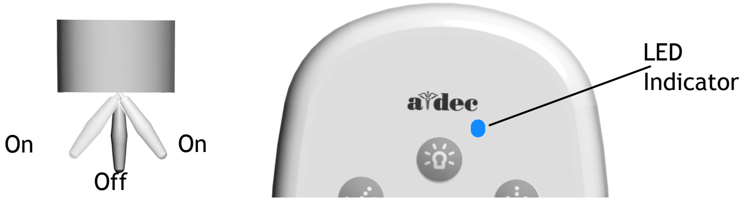


Intensity Switches

A-dec dental lights can be operated from the manual 3-way switch or the optional touchpad. The dental light is always off when the 2-way switch is in the center location. To turn the light on or off from the touchpad, press and hold the dental light button.

The dental light features two intensities: high and composite (low). For systems without a touchpad, flip the 3-way switch either side of center to select the intensity. For systems with a touchpad, ensure that the 2-way switch is in either of the On positions, and press the light button to choose the intensity. When the light is in the composite setting, the LED indicator on the touchpad flashes.

Figure 81. Intensity Switches



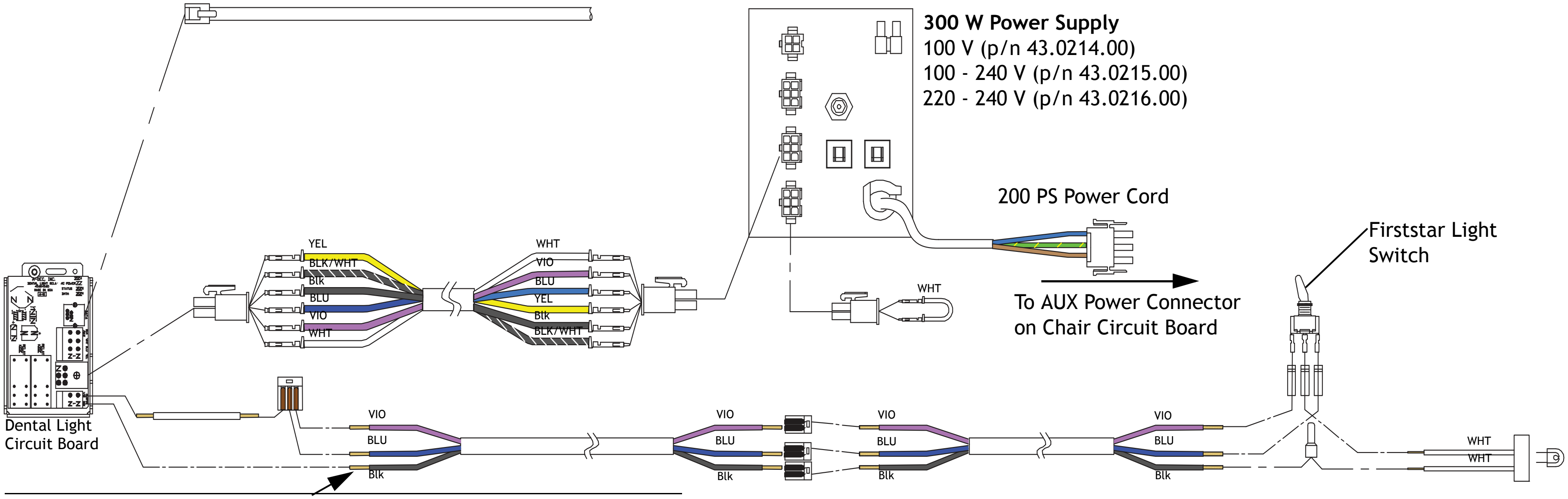
Dental Light Wire Connections on the 200 Dental Chair

Terminal 200 Dental Light	Voltage	Terminal Label	Wire
J2	17/12.1 VAC	VIO	Violet
J2	0 VAC	BLK	Black

NOTE See "Circuit Board Components" on page 9 to identify dental light connections on the chair circuit board.

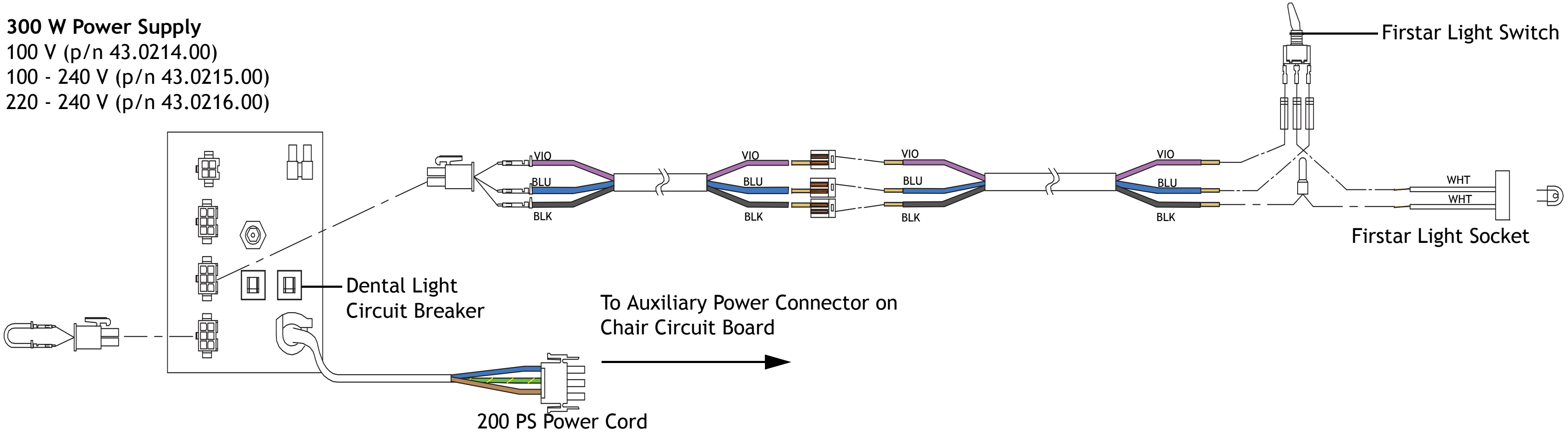
NOTE The LED indicator must be connected to the power supply for the dental light circuit board to function correctly.

Figure 82. Dental Light Wire Connections With Touchpad


300 W Power Supply
100 V (p/n 43.0214.00)
100 - 240 V (p/n 43.0215.00)
220 - 240 V (p/n 43.0216.00)
200 PS Power Cord
Firststar Light Switch
To AUX Power Connector on Chair Circuit Board
WHT
YEL
BLK/WHT
Blk
BLU
VIO
WHT
WHT
VIO
BLU
YEL
Blk
BLK/WHT
Dental Light Circuit Board
VIO
BLU
Blk
VIO
BLU
Blk
VIO
BLU
Blk
VIO
BLU
Blk
WHT
WHT

NOTE For field installation, cut off the existing red connector and strip the wires.

Figure 83. Dental Light Wire Connections Without Touchpad


300 W Power Supply
100 V (p/n 43.0214.00)
100 - 240 V (p/n 43.0215.00)
220 - 240 V (p/n 43.0216.00)
Firstar Light Switch
VIO
BLU
BLK
VIO
BLU
BLK
VIO
BLU
BLK
VIO
BLU
BLK
WHT
WHT
Firstar Light Socket
Dental Light Circuit Breaker
To Auxiliary Power Connector on Chair Circuit Board
200 PS Power Cord

Dental Light Relay Circuit Board

Figure 84. Dental Light Relay Circuit Board

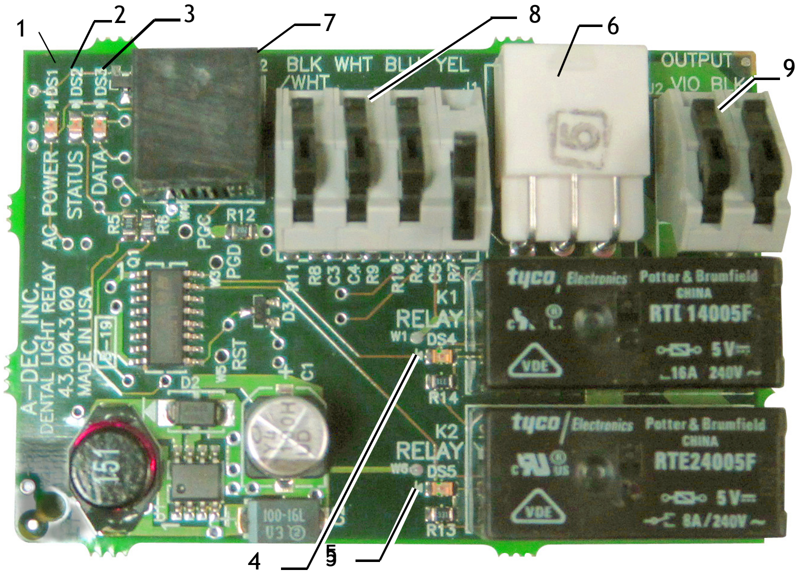


Table 10. Dental Light Relay Circuit Board Descriptions

Item	Description
1	DS1 - AC power LED
2	DS2 - Status LED
3	DS3 - Data LED
4	DS4 - Dental Light relay LED
5	DS5 - Dental light relay LED
6	P1 - Input power
7	P2 - Data port
8	J1 - Toggle switch inputs
9	J2 - Dental light output power

Table 11. Dental Light Output Settings

Function	K1 (DS4)	K2 (D57)	Output
Off	Off	Off	0 VAC
High intensity	On	Off	17 VAC
Composite intensity	Off	On	12 VAC
Medium Intensity	On	On	16 VAC

LED Identification

Table 12. LED Status and Descriptions

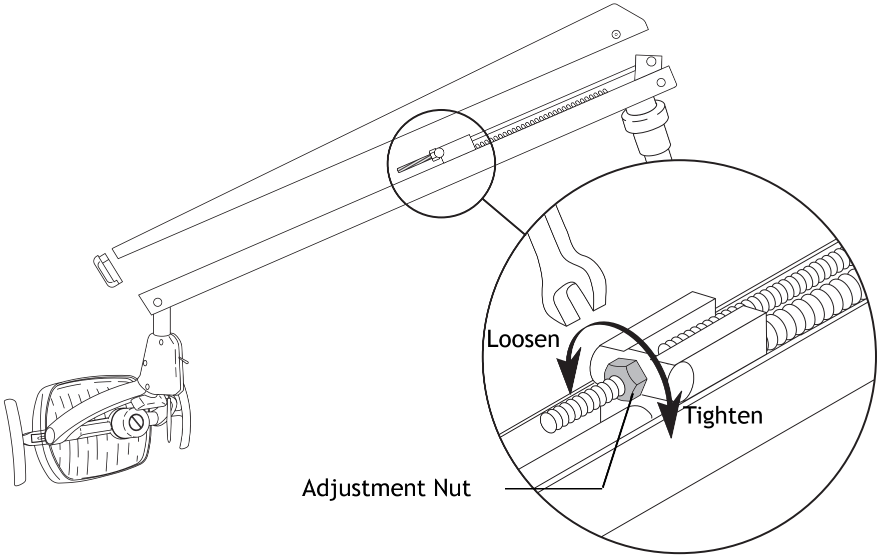
LED	Status	Description
DS1 - AC power LED	Off	No 24 VAC power, tripped circuit breaker, power supply turned off, no line voltage
	Green, steady	24 VAC at the terminal strip
DS2 - Status LED	Off	System is not functioning, no power or circuit board has failed
	Green, steady	Normal operation
DS3 - Data LED	Off	No DCS communication, not connected to the DCS, or DCS has failed
	Green, steady	Detects active DCS
	Green, blinking	Valid DCS message
DS4, DS5 - Dental light relay LEDs	**DS4, DS5**	
	Off, Off	Dental light off
	On, Off	High intensity
	Off, On	Composite intensity
	On, On	Medium intensity

Flexarm Adjustments

Remove the screw and cover from the flexarm. Turn the tension adjustment nut inside the flexarm using a 1/2" open end wrench. Tighten the nut by turning it clockwise, if the flexarm moves too easily, or tends to drift down by itself. Loosen the nut by turning it counterclockwise, if the arm drifts up.

NOTE The weight of the flex arm cover affects the flex arm counter-balance. Set cover on flex arm to test tension adjustment.

Figure 85. Adjustment



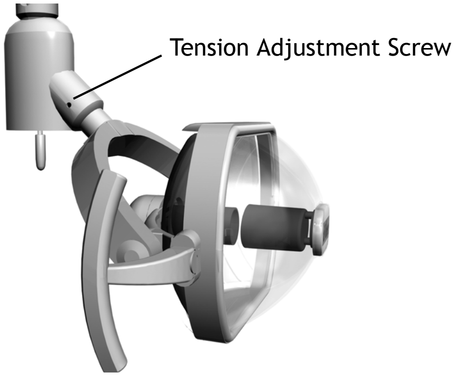
Rotation Adjustments

If the light head is difficult to position, moves too easily, or tends to slip out of position, the rotation tension can be adjusted diagonally and vertically.

Diagonal Adjustment

Use a 5/64" hex key to adjust the setscrew on the pivot housing. Turn the screw clockwise to increase tension; counterclockwise to decrease tension.

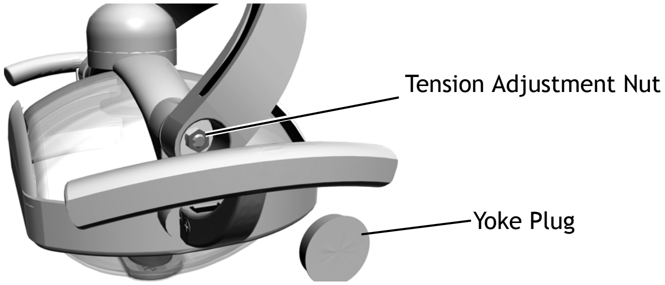
Figure 86. Diagonal Adjustment



Vertical Adjustment

1. Remove the yoke plug on one side of the light.
2. Using a 5/16" nut driver, turn the adjustment nut clockwise to increase tension; counterclockwise to decrease tension.
3. Reinstall the yoke plug.

Figure 87. Vertical Adjustment



Bulb Replacement

Follow these steps when replacing the dental light bulb:

1. Turn the light off and allow it to cool.

WARNING To avoid burning your fingers, allow the bulb to cool before removing. Never operate the dental light with the light shield removed. The clear shield contains UV blocking additives and is also your protection in the unlikely event that the bulb shatters.

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2. Hold the light shield and gently squeeze one side while pulling the shield away from the dental light. Set the light shield aside.
3. Using a gauze pad or cloth to protect your fingers, carefully pull the old bulb from its socket. Discard the bulb.
4. Holding the new bulb in its outer wrapper, carefully insert the bulb pins into the socket. A small section of each pin is still visible when the bulb is fully seated.

CAUTION Take care when handling the bulb. The bulb base is fragile and can break under excessive pressure. Do not remove the outer wrapper when handling the new bulb. Finger oils can affect light performance and severely limit bulb life. If you should inadvertently touch the bulb, gently clean it with cotton dampened with isopropyl or ethyl alcohol.

CAUTION Do not attempt to install the light shield if it has a broken tab. Contact your authorized A-dec dealer for a replacement shield and install it before operating the light.

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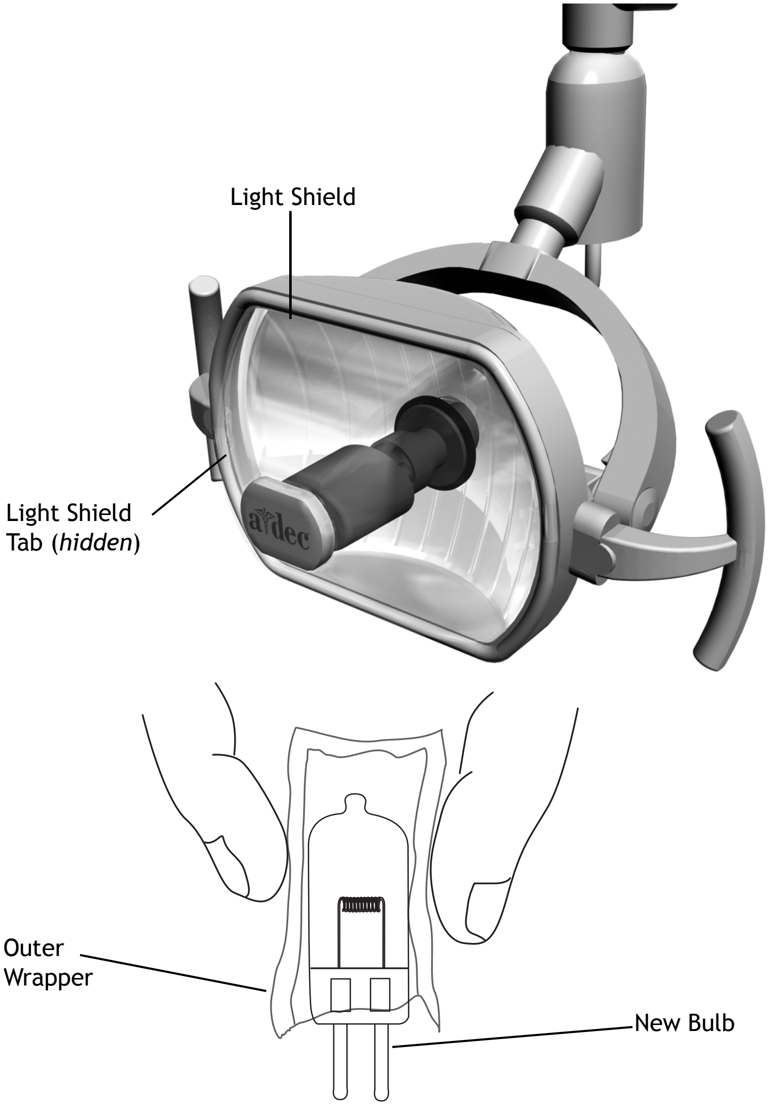
5. Remove and discard the outer wrapper. Then reinstall the light shield.
6. Verify the operation of the light by turning it on and operating it at each intensity setting.

Figure 88. Bulb Replacement



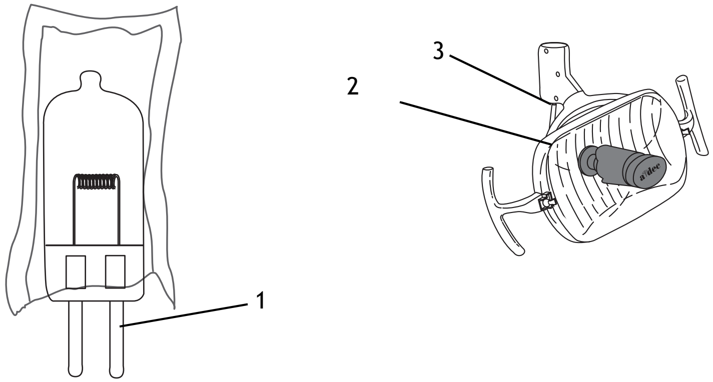
Illustrated Parts Breakdown

This table lists the 200 Dental light parts and part numbers that correspond to the illustration.

200 Dental Light

Item	Part Number	Description
1	041.709.00	Bulb
2	97.0411.00	Shield
3	90.1304.00	Light switch kit
4	90.1309.00	Light socket kit

Figure 89. Dental Light Bulb, Shield and Light Switch Kit



9

TROUBLESHOOTING

The troubleshooting tables contain tips and troubleshooting information to assist in diagnosing problems. This content is not intended to cover every situation, but includes the most common problems that you may encounter.

Dental Chair

Problem	Possible Cause	Action
Factory default test halts during the Base Up test, and the circuit board beeps one time	Input voltage could be low or outside the required range.	Verify that the input voltage and voltage selection resistors (100 - 120 VAC = R72) and R74 (220 - 240 VAC = R 73). If Base limit switch is activated, verify switch operation. If the motor thermal limiter is open, and the motor is hot, wait for the motor to cool off.
	Motor capacitor or Base Up solenoid are defective	Replace the motor capacitor or Base Up solenoid.
	Potentiometer is not changing voltage.	Verify the potentiometer LED comes On when the base is moving. Check the potentiometer mechanical drive and electrical connections.
Chair base or back is stuck in full up position The limit switch is not activated, or Down solenoid poppet is unable to open based on excess hydraulic pressure	Hydraulic lock has occurred	Correct Hydraulic Lock **1.** Remove the motor/pump cover from the chair. **2.** Fit a 5/8" open end wrench to the high pressure outlet port (either lift or tilt, whichever is in hydrostatic lock) of the hydraulic manifold. **3.** Wrap a rag around both the fitting and the end of the wrench. The rag will absorb the small amount of fluid vented from the fitting. **4.** Carefully loosen the fitting about one-half turn, counterclockwise, and re-tighten. **5.** Cycle the chair a couple of times to verify it is no longer in hydraulic lock.
Factory default test halts during the Back Down test, and the circuit board beeps one time	Stop plate limit switch is activated	Verify switch operation

Problem	Possible Cause	Action
	Stop plate is jammed	Remove and reinstall the stop plate.
	Back Down solenoid is defective	Test the solenoid and replace if needed.
	Back is in hydrostatic lock	See Correct Hydraulic Lock, page 91
	Potentiometer is not changing voltage	Verify that the potentiometer LED is On when the back is moving. Check the potentiometer mechanical drive and electrical connections.
Factory default test halts during the Back Up test	Back up limit switch is activated	Verify switch operation.
	Back Up solenoid is defective	Test solenoid and replace if needed.
	Back is in hydrostatic lock	See Correct Hydraulic Lock, page 91
	Potentiometer is not changing voltage.	Verify potentiometer LED is On when base is moving. Check potentiometer mechanical drive and electrical connections.
Factory default test halts during the Base Down test	Stop plate limit switch is activated	Verify switch operation
	Base Down solenoid is defective	Test solenoid and replace if needed.
	Base is in hydrostatic lock	See Correct Hydraulic Lock, page 91
	Potentiometer is not changing voltage	Verify that the potentiometer LED is On when the back is moving. Check the potentiometer mechanical drive and electrical connections.
Chair moves by itself when power is turned On	The jumper is in FACT DEFAULT position	Verify that the jumper is in the SPARE position
	Short circuit in the touchpad or footswitch	Unplug the touchpad and footswitch; reset the circuit breaker. If the problem isn't repeated, the touchpad or footswitch may have shorted.
	Short circuit on the circuit board	Replace the circuit board.
No power to chair or unit. Office still has power.	The chair is unplugged.	**1.** Verify power is available at the outlet. **2.** Plug chair in to power source.
	The Mains On/Off button is in Off position.	Press the Mains On/Off button.

Problem	Possible Cause	Action
No power to chair or unit. Office still has power.	No pilot air to power supply or bypass switch not activated.	**1.** Check air regulator pressure gauge for 80 psi. **2.** Verify pilot air is connected to the power supply and air manual shutoff valve is fully open. **3.** Verify master toggle is in the On position and that the bypass switch is activated.
	Power supply circuit breakers CB1, CB2, CB3, CB4, CB5, or CB6 have tripped.	Check circuit breaker and reset. If the circuit breaker trips again: **1.** Disconnect all power cables, including the chair input power connectors P4, P9, and P12 from the chair board. **2.** Reset the circuit breaker. **3.** Reconnect the power cables one at a time observing which one causes the circuit breaker to trip. **4.** Identify the wiring problem circuit, and repair or replace as needed. Refer to Circuit Board Components, page 9, for component identification. DS14 and DS15 on the chair circuit board indicate that 24 VAC power is present for distributed power. The AC Power LED, DS1, on the chair board indicates 24 VAC is present for the chair board and back motor. If DS1, DS14, or DS15 are Off, verify that the respective circuit breaker is not tripped and reset if it is tripped.
	Power supply has failed	If a power supply circuit breaker continues to trip with all cables (P4, P9, and P12) disconnected from the chair board, replace the power supply.
No base up function. The motor relay clicks. Base LED (DS11) turns on. The chair back functions work.	Disconnected capacitor.	**1.** Verify the base up relay clicks and the LED (DS11) on the chair circuit board is illuminated. **2.** Turn power off if connected. **3.** Check capacitor connections. **4.** Reconnect cables. . **WARNING** The hydraulic system must be depressurized before removing the solenoid. To depressurize the hydraulic system, remove the failed solenoid coil and replace with the operating solenoid coil. Lower the chair base and back. **NOTE** When replacing a solenoid, wipe up any oil, and replace existing O-rings on the solenoid base.
	Chair base thermal limiter has been tripped.	The chair base motor should be limited to a 5 percent duty cycle. If the duty cycle is exceeded for a period of time, a thermal limiter will trip. The thermal limiter is located inside the base pump motor and will auto-reset after a few minutes.

Problem	Possible Cause	Action
	Chair base motor is disconnected.	Verify the motor is connected into the base motor connection (P11 on the circuit board). When base up is activated, the base motor relay should click and DS11 should be on. Verify that P12 is connected to the chair board (mains power from the power supply).
	Failed capacitor.	Replace the capacitor with one of correct voltage.
No base down. Relay clicks and DS12 LED illuminates	Failed base down solenoid coil.	**1.** Check for magnetic pull while operating base down function. (See page 14 for information.) **2.** Check for correct resistance value at solenoid connector: 38 Ohms (Ω) ± 4 Ohms (Ω) **3.** Replace solenoid. (See page 14 for instructions.) **WARNING** The hydraulic system must be depressurized before removing the solenoid. To depressurize the hydraulic system, remove the failed solenoid coil and replace with the operating solenoid coil. Lower the chair base and back. **NOTE** When replacing a solenoid, wipe up any oil, and replace existing O-rings on the solenoid base.
Base or back moves up for only one second, no preset buttons work (limp-along feature) **DS5 (back) not illuminated** **DS6 (base) not illuminated**	The position sensor for that movement is disconnected.	**1.** Check position sensor connections to the chair circuit board. **2.** Reconnect if disconnected. **3.** Verify that the position sensor is connected correctly: Back position sensor into P1, base into P2.
	Failed position sensor.	**1.** Verify that the board's green LED is on. If not, make sure the board is connected. **2.** Replace the position sensor as a complete assembly.
No chair movement from a touchpad, and the touchpad status A-dec logo icon and chair circuit board status LED (DS2) are illuminated, and the footswitch operates the chair	Touchpad DCS is interrupted.	• Connect a known good data line between the touchpad and the chair circuit board. • If the chair circuit board data LED comes on and the chair operates normally with the touchpad, check each data line in the system with the known good line until the bad DCS line is found. • If the chair circuit board data LED stays off, call customer service. (See "Get Support" on page 2 **NOTE** The data and power to the control head mounted touchpad are routed via the control head. Power is supplied using black/gray wires.

Problem	Possible Cause	Action
No chair movement from the touchpad, status icon is not illuminated	Faulty touchpad.	If the LED, DS1 on the touchpad is On, and DS2 (blue status LED) is Off, cycle power to the board. If DS1 remains On and DS2 remains Off, disconnect P3 (on the deluxe touchpad only). If DS1 remains On and DS2 is Off, replace the touchpad. If at any time the DS2 is On, do not replace the touchpad.
	Faulty touchpad power cable or wires.	If the LED, DS1 on the touchpad is Off, verify wires to the touchpad are connected to the WAGOs in the delivery system. Verify 24 VAC at the WAGOs. If 24 VAC is not present at the WAGOs in the delivery system, verify wiring to and from the post box and chair board. Verify that the circuit breaker is not tripped.
Base up or Base down does not travel the full distance	Position sensor connections (P1 and P2) on the chair circuit board are switched.	Verify that the position sensors are connected to correct chair circuit board locations: P1 — Back position sensor P2 — Base position sensor
	The chair stops are not established.	**1.** Place the jumper in the factory default position on the Testpoint header, P3. The chair automatically establishes the soft stops for the chair base and back. When the factory default routine completes, the chair beeps three times to indicate completion. **2.** Place the jumper back into the spare position on the Testpoint header, P3, and verify the chair operates normally.
	Optional height limit has been set.	**1.** If factory default does not establish full positioning extents of base up or base down, the optional height limits may have been set. **2.** Move the jumper in the Testpoint header, P3,on the chair board to EN/DIS TP/FS. **3.** Hold the base up or base down button to remove the height limit for 3 seconds. **4.** One beep confirms the height limit has been removed. **NOTE** If three beeps sound, the optional height limit has been set. To remove the height limit, repeat steps 2 through 3.
Back does not move but base moves as normal	Chair blue status indicator is blinking. The chair back's duty cycle limit has been exceeded.	The duty cycle limit has been exceeded for the back. After one minute, the chair back will operate again.
	Chair back motor is disconnected.	Verify that the motor is connected into the BACK MOTOR connection (P8 on the circuit board). **NOTE** When Back Up is activated, DS9 and DS17 should be On. When Back Down is activated, DS10 and DS17 should be On.
Back up and base down movements do not move, and back down and base up movements move as normal	Jumper not installed on cuspidor circuit board limit switch jumper.	Place and leave a jumper into the cuspidor circuit board limit switch connector, P4.

Problem	Possible Cause	Action
No chair movements	Power may not be present on the circuit board.	**1.** Verify that power is present on the chair circuit board. If DS1 is Off, follow instructions for verifying power connections. **2.** If DS1 is On, use the Testpoint header, P3, to activate chair movements. **3.** If using the Testpoint header, P3, does not activate chair movements, verify that the chair lockout is not activated (DS13 should be Off). **4.** Verify the foot disc is not in use. **5.** If DS13 is On, verify the wiring and plumbing to any local air electric switch connected to J4. Verify the plumbing to the deluxe touchpad transducer (X1) if a deluxe touchpad is on the system.
Unable to change or use chair presets	Position sensor connections (P1 and P2) on the chair circuit board are switched.	Connect position sensor to correct board locations: P1 — Back position sensor P2 — Base position sensor
	Position sensor for that movement is disconnected.	**1.** Check position sensor connections to the chair circuit board. **2.** Reconnect if disconnected.
	Failed position sensor.	**1.** Check for LED on position sensor circuit board, which should be On if connected. **2.** If the LED on the position sensor is Off, and it is connected to the chair board that is On, replace the position sensor as a complete assembly.
No or limited chair functions from footswitch	Footswitch connector/wiring is damaged.	Verify chair operates from a touchpad or the Testpoint header, P3. Replace the footswitch connector and/or wiring assembly.
	Footswitch membrane is damaged.	Check footswitch connectors and membrane, replace as necessary.
The chair makes a growling noise when base up is pressed	Hydraulic hose from reservoir to pump is pinched.	**1.** Inspect all hydraulic hoses, ensure they are not being pinched in any position. **2.** If the supply tube between the pump and the reservoir is kinked, order and install kit.
	Chair is low on hydraulic fluid.	Add hydraulic fluid. See “Hydraulic Fluid Replenishment” on page 23 for the procedure. ⚠ **CAUTION** Use only A-dec hydraulic fluid, p/n 61.0197.00.
	Motor pump has an obstruction or is damaged.	If chair continues to growl, replace the motor assembly.
A button on a touchpad does not work. Function works from other location(s)	Faulty touchpad.	**1.** Verify the function works from other locations (footswitch, chair Testpoint header, P3, and cuspidor buttons). **2.** Verify the touchpad circuit board is snapped into the plastic cover correctly. **3.** If the function still does not work, replace the touchpad.

Problem	Possible Cause	Action
The automatic positions do not work, the A-dec logo is flashing, double blinks	The jumper is in the factory default position on the chair circuit board Testpoint header, P3.	Move the jumper from the factory default position to the “spare” position on the Testpoint header, P3.
Double-articulating headrest does not lock or is difficult to unlock	The headrest needs adjustment or needs replacing.	Adjust the headrest. If the headrest still does not work correctly, replace it as an assembly. No field service to locking components.
A double-articulating headrest may be difficult to move or may drift downward	Glidebar needs tension adjustment.	To adjust the tension, use a 1/8" hex key and turn the tension adjustment screw to the right increase friction to the left to decrease friction.
Circuit breaker 1 or 2 opens	Electrical short in a module.	**1.** Disconnect the identified modules from the power supply. **2.** Reset the circuit breaker. **3.** Reconnect modules one at a time until circuit breaker trips. Refer to troubleshooting for that module.

Delivery System

Problem	Possible Cause	Action
No water to all handpieces	Empty water bottle	Fill the water bottle with treatment water.
	Kinked air or water tubing	Check the water and air tubings for kinks or obstructions.
No water coolant to all the handpieces	Empty water bottle	Fill the water bottle with treatment water.
	The wet/dry toggle on the foot control is in the dry position	Pick up a wet handpiece, and move the wet/dry toggle to the wet (blue dot) position.
	Water coolant air signal shuttle valve faulty.	Check for air leaking from the flush toggle valve when the foot control is stepped on. If a leak is present, replace the shuttle valve.
	No water coolant air signal from the foot control wet/dry toggle	Check the clear tubing from the foot control for kinks or obstructions: **1.** Disconnect the green short-dash (water coolant air signal) tubing from the in-line barb in the chair lift arm. **2.** With the wet/dry toggle in the wet position (toward blue dot), step on the foot control. There should be ~80 psi (5.52 bar) of air at the tubing end. **3.** If no air is present, check: • Wet/dry toggle • Plugged barbs • Adequate air supply
	Water coolant flow controls require adjustment	See "Handpiece Control Adjustments" on page 40.
No water coolant to one handpiece	Water coolant adjustment stem closed or requires adjustment	See "Handpiece Control Adjustments" on page 40.
	Water coolant not activated	**1.** Activate handpiece. **2.** Flip the foot control wet/dry toggle toward the blue dot. **3.** Verify the handpiece has water coolant.
	Plugged handpiece tubing, terminal or coupler	**1.** Remove handpiece and coupler from tubing. **2.** Operate foot control with water coolant On. **3.** Check to see if water is coming out of the handpiece tubing. **4.** If no water, check for water coolant at the handpiece position on the control block.

Problem	Possible Cause	Action
	Failed water coolant cartridge.	Exchange the failed cartridge with known good cartridge and test the handpiece position.
	Dry cartridge is in the handpiece water cartridge position of the control block.	Replace the dry cartridge with a water cartridge.
Sputtering water from handpieces	Faulty or dirty O-ring on barb of water bottle pickup tube.	Replace the O-ring. Apply a thin application of silicone grease to the new O-ring.
	Damaged pick-up tube.	Replace pick-up tube.
Intermittent water coolant to handpieces	Faulty O-rings on handpiece coupler.	Replace the O-rings on the handpiece coupler.
	Water coolant pressure too low, or air coolant pressure too high.	Adjust water and air coolant as required. See "Handpiece Control Adjustments" on page 40.
	Water bottle pickup tube too long.	Shorten the pickup tube with a diagonal cut at the end.
Water leaks from vent hole in control block when a wet handpiece is in use	Faulty water coolant cartridge.	**1.** Replace water coolant cartridge with known good cartridge. **2.** If water continues to leak from vent hole, inspect the control block for debris or scratches. **3.** Replace if necessary.
A wet handpiece drips water while in its holder	Faulty water coolant cartridge.	**1.** Replace water coolant cartridge with known good cartridge. **2.** If water continues to leak from handpiece, inspect the control block for debris or scratches. **3.** Replace if necessary.
	Faulty handpiece or coupler.	Remove handpiece and coupler, and retest water coolant flow.
	Faulty control block diaphragm.	Replace the diaphragm.
Water leaks from the water coolant stem	Damaged O-rings on water coolant stem.	Replace the stem or the O-rings on the stem.
Water continues to flow after foot control is released	Restricted water coolant tube in the handpiece or coupler.	**1.** Remove handpiece and coupler. **2.** Retest water coolant flow.
	Pinched tubing in the foot control.	Check that the green tube with the short dash is not pinched between the foot control and the control head.
	Water coolant flow set too high.	See "Handpiece Control Adjustments" on page 40.
	The foot control relay valve sticks.	Install a foot control field service kit in the foot control.

Problem	Possible Cause	Action
Any handpiece drips when lifted from holder. Foot control is not activated	Faulty flush toggle valve.	**1.** Check for 80 psi air to flush valve. **2.** Replace the flush toggle valve.
	Faulty control block diaphragm.	Replace the control block diaphragm.
Cannot flush one or more handpiece tubings	A dry cartridge is in place for this handpiece.	Change the dry cartridge to a water cartridge.
	Handpiece or coupler plugged.	Remove handpiece and coupler and test flush.
Excessive water coolant at all wet handpieces. Water coolant flow adjustments do not affect flow	Flush water hold back has failed.	Check for 80 psi air out of the flush valve to the control block. Check for pinched yellow tube between the flush valve and the control block. If no pinched tubing, replace the flush valve.
	No data communication between QVIOLS and touchpad.	Verify that DS3 (DATA) is On on both boards. The switch assembly should be connected to QVIOLS if present. Verify a data line connects the QVIOLS to the touchpad, or both are connected to the data port module.
	Switches are not activated when a handpiece is removed. Holder valve is not engaging switch.	Verify mounting of switch assembly.
	Switch levers are activated when handpiece is in the holder. The system does not recognize the new handpiece and DS3 (DATA) is On on both boards. System is wired correctly.	Verify the amount of resistance for each control head switch. Control head switch resistance should be 40 Ohms(Ω) when its respective handpiece is in the holder.
Buttons on touchpad do not work, but status icon LED is On	Faulty data line from touchpad to the data board or from the data board to other boards.	Replace data line with known good data line.
Touchpad does not operate chair, cuspidor or light functions	Faulty data line from data port circuit board in the control head to the data port board in post box.	Replace data line with known good data line.
Touchpad status icon does not light when the master toggle is On	No power to chair.	Verify the chair is plugged in, the power button is On and the pilot tubing is connected to the power supply air-electric switch.

Problem	Possible Cause	Action
	No power to touchpad.	Verify that DS1 is illuminated on the touchpad system circuit board. If DS1 is not illuminated, check for 24 VAC across WAGO connections in the control head. Check for an open circuit breaker on the 300W power supply.
Low air pressure to syringe or handpieces when in use	Plugged filter on air filter regulator.	Replace the filter.
Handpiece holder valve leaking air	Faulty holder valve.	Verify the holder valve is not plumbed backward. Replace holder valve.
Handpiece holder valve not exhausting	Holder valve locked.	Verify the holder valve is active (unlocked).
	Faulty holder valve.	Replace holder valve.
Fiber-optics does not work but touchpad screen changes when handpiece is removed	Bulb has failed.	Replace the bulb.
	Not configured to come on.	Check the Deluxe touchpad intraoral light source setup options for that handpiece.
	Connected to incorrect handpiece output on QVIOLS.	Verify that the intraoral light source is connected to the correct output, and verify that the respective output LED is On on the QVIOLS.
Bulb is too dim or bright	Incorrect fiber-optic voltage set.	Adjust fiber-optic to correct voltage, current, and wire length per manufacturer specification.

Holders

Problem	Possible Cause	Action
Handpiece does not operate	Handpiece was lifted too soon.	When the handpiece is set back in its holder, there is a three second delay before the handpiece will start again.

Utility Area

Problem	Possible Cause	Action
Unit air pressure drops when unit is in use	Plugged filter element in air filter/regulator	**1.** Flip the master toggle to the On position and remove the floor box cover. **2.** Locate and observe the air pressure gauge in the floor box while pressing the syringe air button. If the air pressure drops more than 15 psi, the air filter is clogged. Replace filter.

Cuspidor

Problem	Possible Cause	Action
DS1 - AC Power LED	Off	No 24 VAC power, tripped circuit breaker, power supply turned Off, no line voltage.
	Green, steady	24 VAC at terminal strip.
DS2 - Status LED	Off	System is not functioning, no power or circuit board has failed.
	Green, steady	Normal condition.
DS3 - Data LED	Off	No DCS communication, not connected to the data communication system, the DCS has failed.
	Green, steady	Active DCS detected.
	Green, blinking	Valid DCS message.
DS4 - Auxiliary relay LED	Off	Auxiliary relay is off.
	Yellow	Auxiliary relay is on.
DS5, DS6 - Bowl rinse/cupfill relays	Off	Relay is off.
	Yellow	Relay is on.
DS7 - Cuspidor limit switch LED	Off	Limit switch is not activated (closed).
	Red	Limit switch is activated (open).
Water drips from the cupfill spout	The cupfill solenoid has failed.	**1.** Using the master On/Off toggle, turn the unit OFF. **2.** Use a syringe to bleed the dental unit water pressure. **3.** Remove the cupfill solenoid and replace.
Water drips from the bowl rinse spout	The bowl rinse solenoid has failed.	**1.** Flip the master on/off toggle to the OFF position. **2.** Use a syringe to bleed the dental unit water pressure. **3.** Replace the bowl rinse water solenoid.

Cuspidor Troubleshooting

Problem	**Possible Cause**	**Action**
Cupfill and bowl rinse functions are switched	The cuspidor water solenoid connectors are reversed on the cuspidor circuit board.	Switch water solenoid connections at P6 and P7.
Cupfill and bowl rinse functions are switched at the tower buttons only (touchpads operate normally)	The cuspidor tower switch connectors are reversed on the cuspidor circuit board.	Switch tower switch connections at P2 and P3.
Water runs constantly from either the cupfill or bowl rinse spout, and the red LED (DS7) is illuminated on the cuspidor circuit board	The cuspidor stop switch connector is reversed with one of the cuspidor tower switch connectors.	The red LED (DS7) on the cuspidor circuit board is illuminated. **1.** Disconnect all three switch connectors from the cuspidor circuit board. One at a time, connect each of the switch connectors to the cuspidor circuit board until the red LED goes out. **2.** Connect one of the remaining switch connectors to P3 on the cuspidor circuit board, and the other switch connector to P2. **3.** Verify that a cupfill cycle runs when requested from the cuspidor tower cupfill button. **4.** If the bowl rinse runs, swap the two switch connections to the cuspidor circuit board.
Cupfill spout sputters air/ water	The self-contained water bottle is empty or nearly empty.	Refill the bottle.
The cupfill spout sputters excessively	The cuspidor air trap valve is faulty.	Remove and replace the air trap valve.
Cuspidor works but the red LED (DS7) on the cuspidor circuit board is illuminated	The cuspidor stop switch is activated or the wiring is faulty.	**1.** Remove any obstacles from under the cuspidor bowl. **2.** Disconnect the cuspidor stop switch from P4 on the cuspidor circuit board; install the jumper from P1 on the cuspidor circuit board. **3.** If the red LED on the cuspidor circuit board goes out, the cuspidor stop switch or wiring is faulty and must be replaced.
Bowl rinse button on the cuspidor tower does not work, and the function does work from the touchpad	Cuspidor tower bowl rinse button assembly is faulty or is disconnected from the cuspidor circuit board P2 connector.	Visually inspect the cuspidor circuit board. Ensure that the cuspidor tower switches are connected. • P2 - Bowl rinse switch • P3 - Cupfill switch If the switches are connected, check the continuity of the bowl rinse switch with an Ohm meter. With the bowl rinse switch held down (closed), it should measure less than ten Ohms. If it measures “open” across the closed switch, remove and replace the bowl rinse switch assembly **Note**: Switching switch assemblies at P2 and P3 allows verification that the switch assembly is defective.

Cuspidor Troubleshooting

Problem	Possible Cause	Action
Cupfill button on the cuspidor tower does not work, and the function does work from the touchpad	Cuspidor tower cupfill button assembly is faulty or is disconnected from the cuspidor circuit board P3 connector.	Visually inspect the cuspidor circuit board, ensure that the cuspidor tower switches are connected: • P2 - Bowl Rinse Switch • P3 - Cupfill Switch If the switches are connected, check the continuity of the cupfill switch with an Ohm meter. With the cupfill switch held down (closed), it should measure less than ten Ohms. If it measures “open” across the closed switch, remove and replace the cupfill switch assembly. **Note**: Switching switch assemblies at P2 and P3 allows verification that the switch assembly is defective.
Inadequate or excessive cupfill water flow	The cupfill water flow needs adjustment	Open the cupfill pinch clamp needs adjustment.
	The self-contained water system 40 psi regulator has failed	Test the 40 psi regulator: **1.** Turn the dental unit OFF using the master On/Off toggle. **2.** Remove the water bottle from the dental unit and set it aside. **3.** Remove the air bleed setscrew from the water bottle receptacle assembly and set it aside. **4.** Install an 1/8" barb with washer in the port where the air bleed setscrew was removed. **5.** Connect an air pressure gauge to the 1/8" barb using the 1/8" tubing. **6.** Turn the dental unit ON. The air pressure reading on the gauge should be 35 - 40 psi. If a reading of 35-40 psi could not be obtained at the air bleed setscrew port, the water bottle receptacle is faulty and must be replaced.
Inadequate or excessive cupfill water flow (continued).	The self-contained water system 40 psi regulator has failed.	If a reading of 35 - 40 psi could not be obtained at the air bleed setscrew port, the 40 psi regulator is faulty and must be replaced as follows: **1.** Turn the dental unit OFF using the master On/Off toggle on the delivery system. **2.** Remove the water bottle cap assembly from the post or side support. **3.** Remove and replace the water bottle receptacle. **4.** Reinstall the water bottle cap assembly and water bottle. **5.** Turn the dental unit ON and test the cupfill function for adequate water pressure.
	The self-contained water system air bleed set screw is partially clogged with debris.	**1.** Use the master On/Off toggle, to turn the dental unit off, and remove the water bottle. **2.** Remove the air bleed setscrew from the water bottle cap assembly and clean it of debris, or replace it. **3.** Reinstall the setscrew in the water bottle cap assembly and replace the water bottle. **4.** Turn the dental unit ON and test the cupfill function.

Cuspidor Troubleshooting

Problem	Possible Cause	Action
Inadequate bowl rinse water flow.	The bowl rinse water flow must be adjusted.	Adjust the bowl rinse flow clockwise to increase water flow, or counterclockwise to decrease flow, (one full turn from minimum to maximum).
	The water filter element is partially plugged.	Check for plugged water regulator filter element. **1.** Close the city water manual shut-off valve in the floor box and bleed the cuspidor bowl rinse water pressure, using the bowl rinse function. **2.** Turn the dental unit off using the master On/Off toggle on the delivery system and remove the water regulator filter element cap. Remove and discard the filter element. **3.** Install a new filter element on the water regulator and reinstall the filter cap. **4.** Open the city water manual shut-off valve. Turn the dental unit on using the master On/Off toggle, and test the bowl rinse function for adequate water flow.
	There is a kinked hose.	Check for a restriction downstream from the filter. Locate and eliminate any kinks in the blue 5/16" bowl rinse water tube.
Bowl rinse function does not work from the cuspidor tower and/or the touchpad bowl rinse button, and the cupfill function does work	The bowl rinse relay on the cuspidor circuit board has failed.	At the cuspidor circuit board, swap the water solenoid connectors at P6 and P7. Press the cupfill button on any touchpad or the cupfill switch on the cuspidor tower, if the bowl rinse runs, remove and replace the cuspidor circuit board.
	The cuspidor data line is damaged.	Ensure that the cuspidor tower switches are connected: • P2 – Bowl rinse switch • P3 – Cupfill switch Disconnect the data line from the cuspidor and press the bowl rinse switch on the cuspidor tower. If the bowl rinse runs, remove and replace the cuspidor data line.
	The bowl rinse solenoid has failed.	Remove and replace the bowl rinse water solenoid.
Cupfill function does not work from the cuspidor tower and/or from any touchpad cupfill button, and the bowl rinse function does work	The cupfill relay on the cuspidor circuit board has failed.	Swap the water solenoid connectors at P6 and P7, at the cuspidor circuit board. Press Bowl Rinse on any touchpad or the bowl rinse switch on the cuspidor tower. If the cupfill runs, remove and replace the cuspidor circuit board.
	The cuspidor data line is damaged.	Ensure that the cuspidor tower switches are connected correctly: • P2 – Bowl rinse switch • P3 – Cupfill switch Disconnect the data line from the cuspidor and press the cupfill switch on the cuspidor tower. If the cupfill runs, remove and replace the cuspidor data line.
	The cupfill water solenoid has failed.	Remove and replace the cupfill water solenoid.

Dental Lights

Problem	Possible Cause	Action
Light does not work (light connected to 200 dental light relay board)	The bulb has failed.	Check for voltage at the bulb socket, if voltage is present, replace the bulb.
		Check the color of the bulb, replace if discolored.
	The dental light circuit breaker, CB6, has been tripped or the power supply has failed.	• Check the circuit breaker and reset it. If the circuit breaker trips again, disconnect P4, J5, and J6 on the 200 chair board. If the circuit breaker trips again, replace the power supply. • If the circuit breaker does not trip, reconnect P4. If the circuit breaker now trips, replace the 200 chair circuit board. • If the circuit breaker does not trip, reconnect the connections to J5. If the circuit breaker trips, replace the dental light.
		The dental light circuit breaker is near the power transformer. If the breaker is tripped, disconnect the dental light wiring harness from the transformer and reset the breaker. If the breaker trips again, replace the circuit breaker. If the breaker does not trip, the dental wiring harness or a switch is faulty.
	The bulb socket is faulty.	Replace the socket.
	Light switch is not in one of the "on" positions	Turn the light switch to either on position.
Light works from the dental light switches but not from a touchpad	Faulty data line from the touchpad to the circuit board.	Temporarily substitute a known good data line from the touchpad to the circuit board, if the light works from the touchpad, determine and replace any bad bypassed data lines.
	Light cable is plugged directly into power supply.	See page 84 for instructions on correctly connecting the light cable to the dental light relay board.
Light head is loose or difficult to position	Rotation tension screws are too loose or tight.	Adjust the appropriate axis tension.
Flexarm drifts	Tension adjustment nut inside the flexarm is too loose or tight.	Adjust the flexarm counterbalance.
Light intensity is dim, inconsistent, or the color is distorted	Reflector or light shield may be damaged.	Inspect the dental light shield and reflector for damage or contamination. Replace or clean as necessary.
		⚠ **CAUTION** Abrasives, disinfectants or chlorine damage the shield and reflector. Refer to the Instructions for Use for cleaning instructions.
	The mains voltage is low.	Verify the mains voltage is within specifications: 100/110-120/220-240 VAC

Problem	Possible Cause	Action
Unsatisfactory light pattern	Light is out of focus, reflector or light shield may be damaged.	**1.** Focus the light. **2.** Check the light shield for severe abrasions, and replace if necessary. **3.** Clean the reflector and light shield.
Light switch does not turn the light on (no relay board)	No mains voltage/unit is off	Verify that the unit is turned on
	Light cable is not connected or connected incorrectly	Verify that the cable is connected correctly
	Faulty light switch	Replace the switch
	Faulty bulb/socket	Replace the bulb or socket

TUBING AND FLOW DIAGRAMS

A-dec Tubing

Antimicrobial AlphaSan and Color Tracer Markings

In 2005 A-dec began blending a type of tubing called antimicrobial AlphaSan (*Antimicrobial AlphaSan*®) for use in A-dec products. This type of tubing is used for water lines in A-dec systems. Tubing with the Antimicrobial AlphaSan tracer marking contains antimicrobial properties. Not all tubing used in A-dec products is antimicrobial A-dec tubing.

Figure 90. Tubing with Antimicrobial AlphaSan Tracer Marking

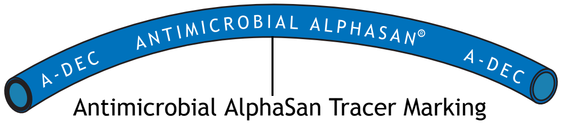

A-DEC
ANTIMICROBIAL ALPHASAN®
A-DEC
Antimicrobial AlphaSan Tracer Marking

Figure 91. Tubing with Color Tracer Marking

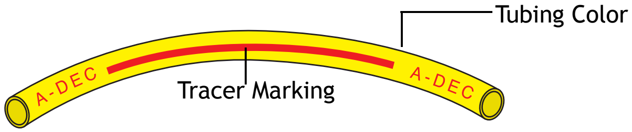

Tubing Color
A-DEC
Tracer Marking
A-DEC

Figure 13 lists functions, descriptions, and part numbers for A-dec Tubing. Identify tubing functions by the tubing color and tracer markings.

Table 13. A-dec Tubing Identification

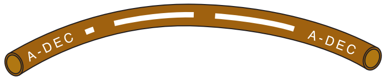
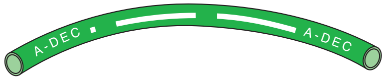
Tubing Function	Description	Tubing Color/Tracer	Part Number
Chip blower/accessory button	Chip blower air - 1/8" OD, brown/white long dash		036.014.02
Air coolant signal	Air coolant signal air from foot control; signal air for cuspidor cupfill and vacuum actuator - 1/8" OD, green/white long dash		036.006.03

Table 13. A-dec Tubing Identification (continued)

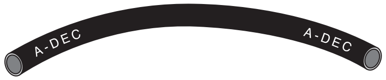
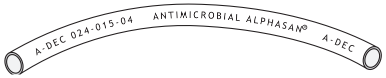
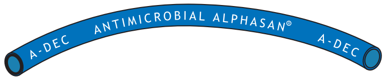
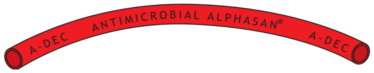
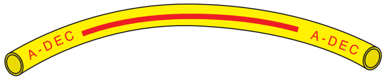
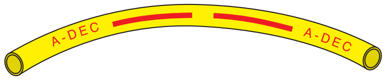
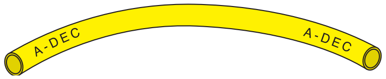
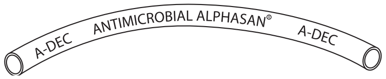
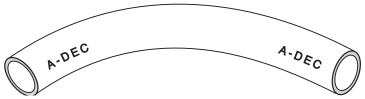
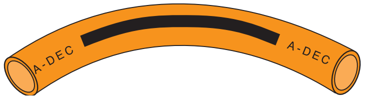
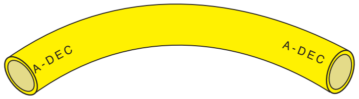
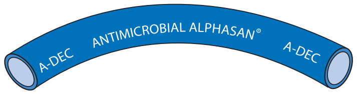
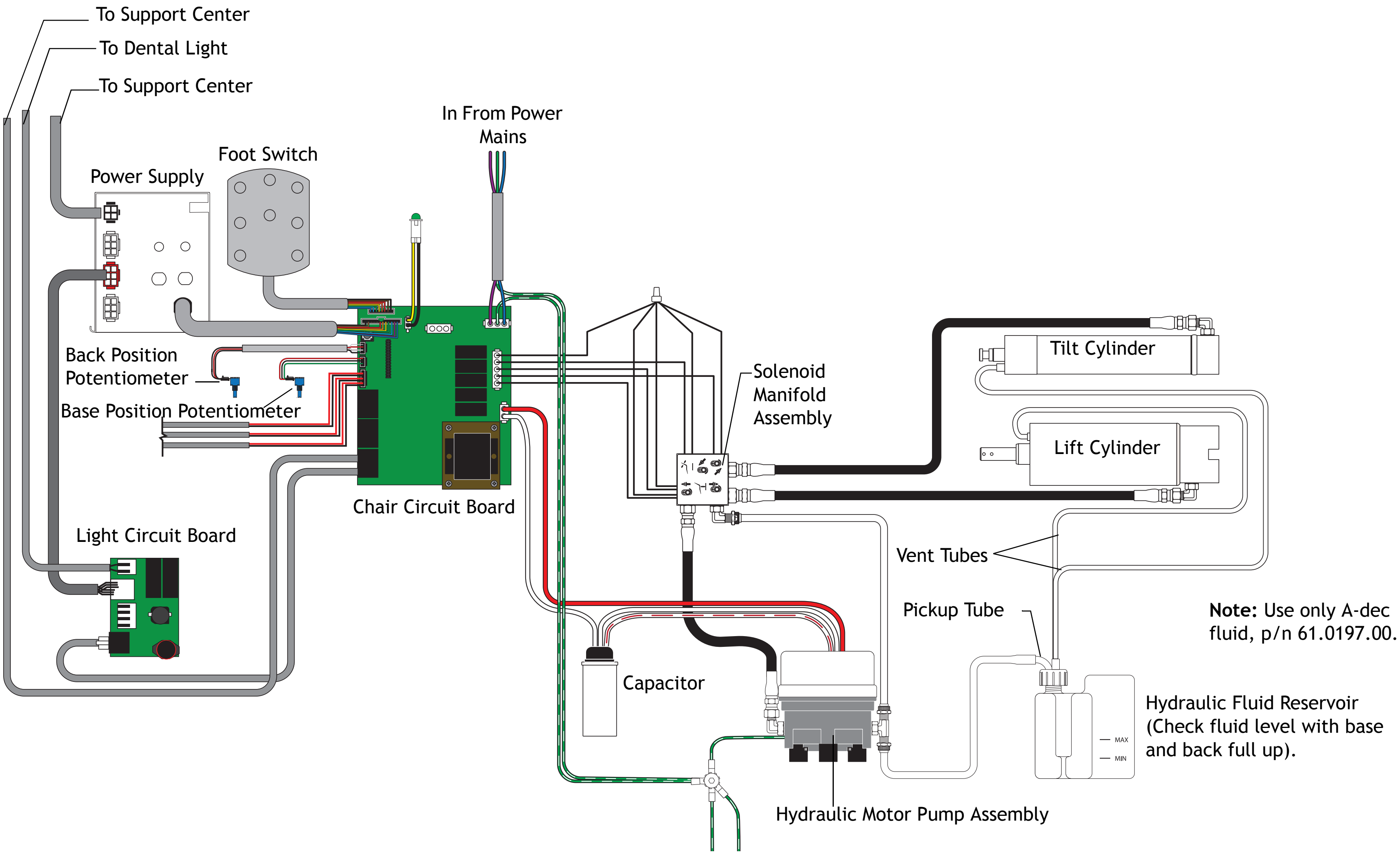
Tubing Function	Description	Tubing Color/Tracer	Part Number
Unregulated air	Unregulated air to flexarm brake - 1/8” OD, black		036.020.03
Water coolant signal air	Signal air (clear) from foot control valve to wet/dry toggle - 1/8" OD, clear	 A-DEC 024-015-04 ANTIMICROBIAL ALPHASAN® A-DEC	024.015.04
Water supply, cold water (regulated)	Oral cavity water - 1/8" OD, blue	 A-DEC ANTIMICROBIAL ALPHASAN® A-DEC	036.004.03
Oral cavity water	Syringe water, with/without water heater - 1/8" OD, red	 A-DEC ANTIMICROBIAL ALPHASAN® A-DEC	036.005.03
Unregulated air, master air	Continuous, filtered, unregulated air - 1/8" OD from the air filter regulator to the master toggle, yellow/red stripe		036.013.03
Pilot air	Filtered unregulated air controlled by master toggle - 1/8" OD, yellow/red dash		036.009.04
Regulated air	Continuous, filtered, regulated air - 1/8" OD, yellow		036.003.03
Miscellaneous	Miscellaneous line for use with A-dec authorized accessories - 1/8" OD, white	 A-DEC ANTIMICROBIAL ALPHASAN® A-DEC	036.019.03
Hydraulic fluid	Low pressure hydraulic system supply for chair - 3/8" OD, clear		036.035.00

Table 13. A-dec Tubing Identification (continued)

Tubing Function	Description	Tubing Color/Tracer	Part Number
Drive air	Drive air from foot control to delivery system - 5/16" OD, orange		036.115.01
Regulated air	Supplies regulated air to the flush toggle and syringe - 5/16" OD, yellow		036.114.01
Water supply	Water bottle and city water - 5/16" OD, blue	 A-DEC ANTIMICROBIAL ALPHASAN® A-DEC	036.116.01

Chair Flow Diagram

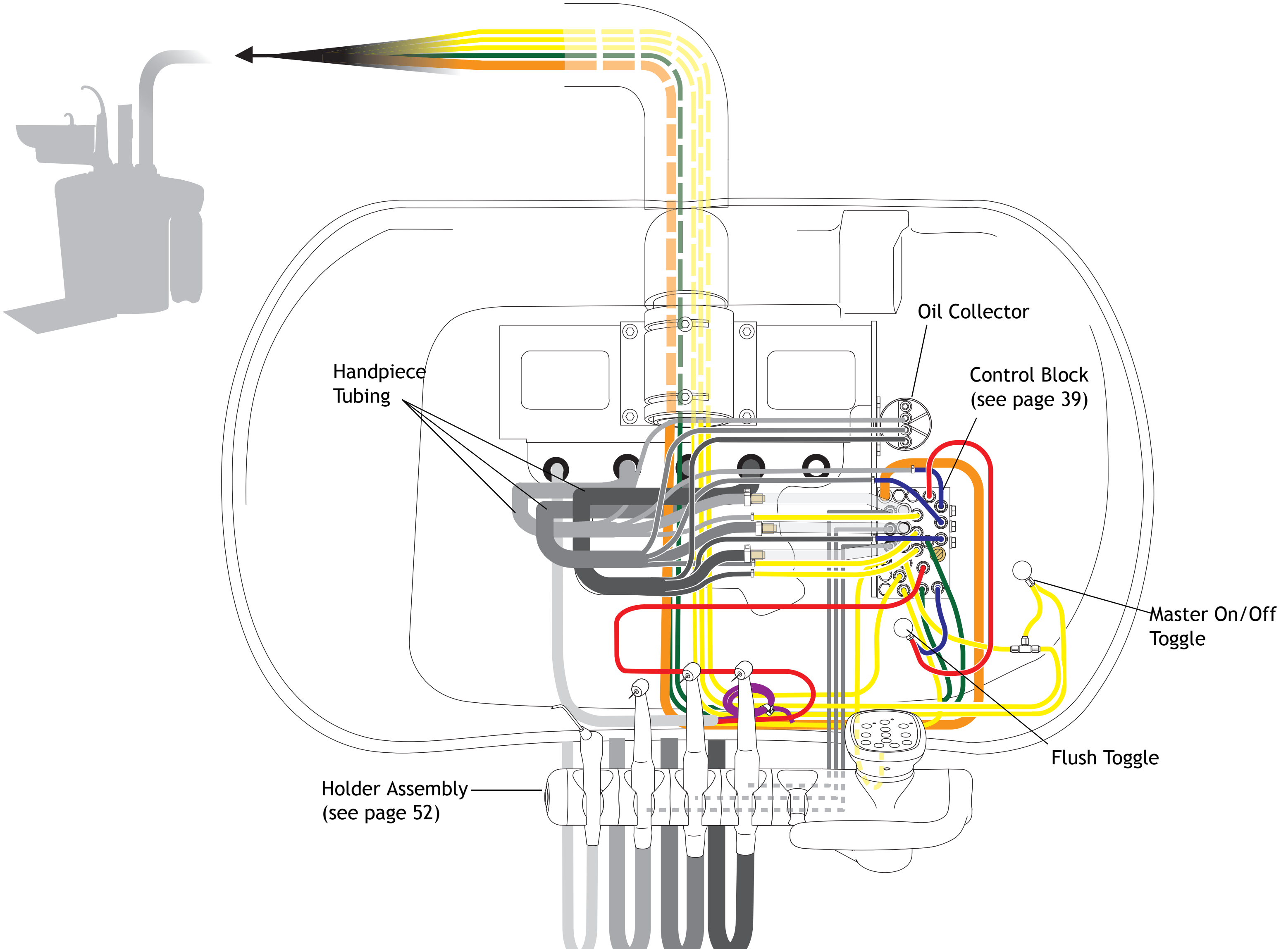
Figure 92. Chair Flow Diagram


To Support Center
To Dental Light
To Support Center
In From Power Mains
Foot Switch
Power Supply
Back Position Potentiometer
Base Position Potentiometer
Solenoid Manifold Assembly
Tilt Cylinder
Lift Cylinder
Chair Circuit Board
Light Circuit Board
Vent Tubes
Pickup Tube
Capacitor
MAX
MIN
Hydraulic Fluid Reservoir (Check fluid level with base and back full up).
Hydraulic Motor Pump Assembly

Note: Use only A-dec fluid, p/n 61.0197.00.

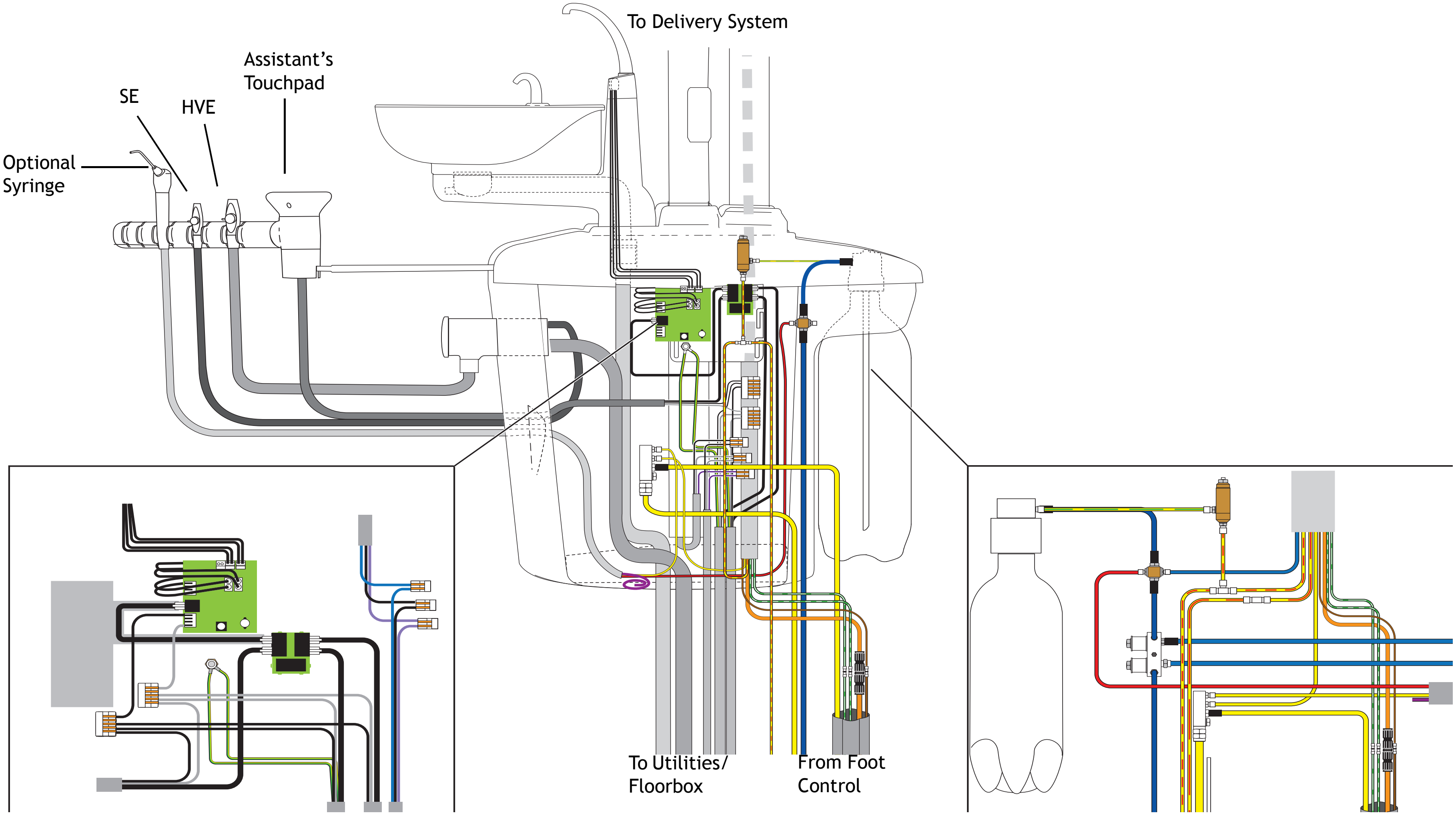
Delivery System Flow Diagram

Figure 93. Delivery System Flow Diagram


Oil Collector
Control Block
(see page 39)
Handpiece
Tubing
Master On/Off
Toggle
Flush Toggle
Holder Assembly
(see page 52)

Assistant's and Support Center Flow Diagram

Figure 94. Standard Assistant's Instrumentation Flow Diagram


To Delivery System
Assistant's Touchpad
SE
HVE
Optional Syringe
To Utilities/ Floorbox
From Foot Control

NOTE If cable ties are present in the product and you need to remove them for servicing, make sure to replace the ties after service is completed.

Utilities Flow Diagram

Figure 95. A-dec 200 Utilities

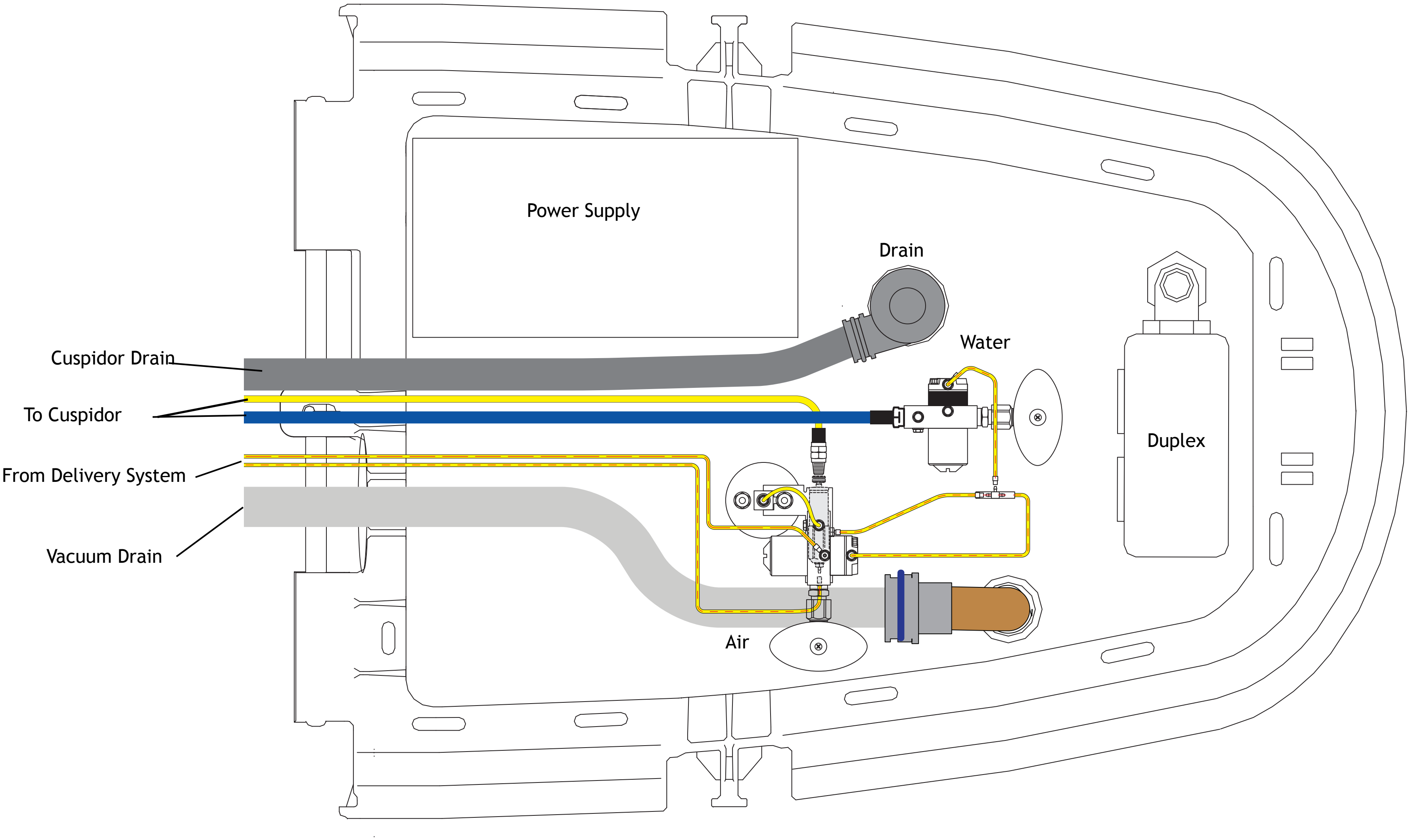
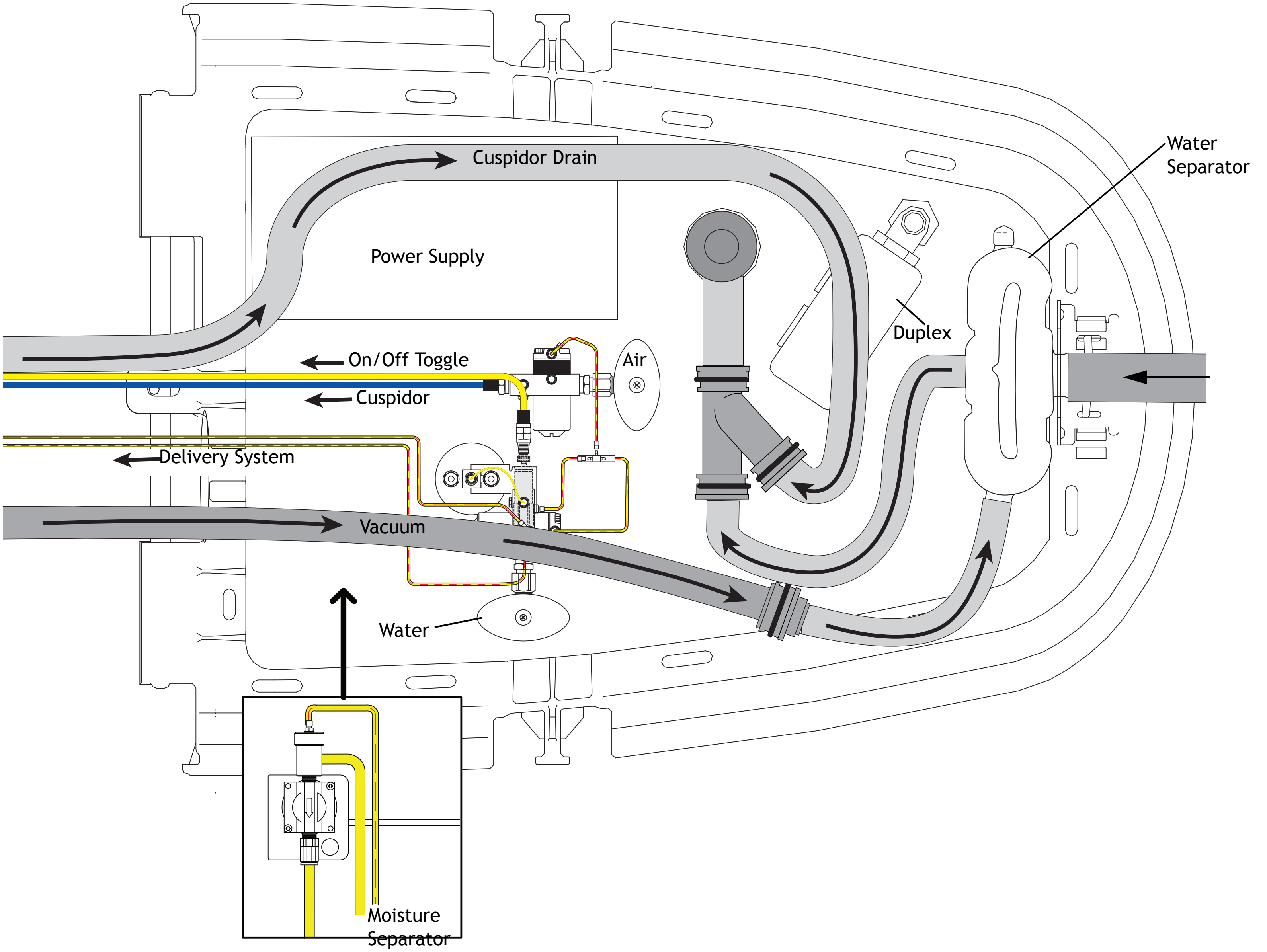

Power Supply
Drain
Water
Duplex
Cuspidor Drain
To Cuspidor
From Delivery System
Vacuum Drain
Air

Figure 96. A-dec 200 Optional Utilities Flow Diagram


Cuspidor Drain
Water
Separator
Power Supply
Duplex
On/Off Toggle
Air
Cuspidor
Delivery System
Vacuum
Water
Moisture
Separator

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